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An Analysis of Price Formation in Port Markets in Atlantic Canada

Economic and Commercial Analysis
Report No. 3

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An Analysis of Price Formation in Port Markets in Atlantic Canada

Economic Analysis and Statistics Division

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EXECUTIVE SUMMARY

Industry Structure

Industry structure plays an important role in the formation of fish prices in port markets. The characteristics of an industry usually used to define its structure are: the number and relative size of buyers and sellers, the nature of the relationships among them, and industry entry and exit conditions. The number and relative size of buyers and sellers provides an indication of market power and reflects the degree of price competition. Vertical integration and informal ties inhibit the independence of buyers and sellers so that transactions between them may not be subject to competition from others. Freedom of entry and exit are fundamental to competitive behaviour. The greater the barriers to entry and impediments to exit, the less competitive pricing behaviour is likely to be.

Port market structures in Atlantic Canada vary, but may be described generally as either oligopsonistic or monopolistic (bilateral). Inshore ports in the Maritimes and Quebec fall into the oligopsonistic category. Most ports have between one and three buyers, with the largest often accounting for upwards of 90 percent of purchases. In contrast, the selling side typically consists of a large number of at least nominally independent fishermen, none of whom is sufficiently large to influence the market. The market structures in Newfoundland more closely approximate bilateral monopolies, with minimum prices established through collective bargaining between processors and fishermen's unions. Buyer concentration is high, but unionization provides fishermen with a measure of countervailing power. In offshore ports throughout Atlantic Canada the "sellers" form part of vertically integrated companies and accordingly lack the independence to operate competitively.

Buyer and seller ties are important characteristics of market structure in both the offshore and inshore sectors of the industry. In the offshore sector the ties are formal; processing companies own the fishing vessels that supply most of their raw material requirements. The main implication of vertical integration for price formation is that landings are committed to the vessel's owner and hence are not subject to competition from other buyers. The structural constraint to price competition is reinforced by contractual arrangements (collective agreements in most cases) between owners and fishermen. Buyer-seller ties in the inshore sector are informal. The relationship may be characterized as one of mutual dependence. The fisherman agrees to sell his fish to a particular processor in exchange for an agreement by that processor to buy all fish (at the going price) and to provide a range of handling, transportation and other services. The ties are stable and strong enough to rule out almost all meaningful price competition in most port markets.

There are significant barriers to entering the harvesting and processing sectors. The main barrier confronting those wishing to enter the fishery is the licensing system. Since 1973, the offshore fishery has been closed to the entry of new vessels. Limited entry licensing became comprehensive in the inshore fishery in 1980. There are no comparable restrictions to entering the processing sector. Rather, the barriers to entry are related to capital costs and the difficulties associated with obtaining access to supplies of raw fish.

Though the fishing industry affords marginal incomes to many of its participants, there are few incentives to leave the industry and a number of incentives to remain in it. The greatest impediments to exit facing participants are the limited alternative sources of employment for their labour and capital. These impediments are complemented by an assortment of financial and non-financial programs making continued participation relatively attractive. The impediments to exit by fishermen could have a depressive effect on prices in the long run, while the impediments to exit by processors could have the opposite effect; the net effect is ambiguous.

Price Behaviour

The port market operates as one link in the chain of market transactions required to move fish from the ocean to the final consumer. The U.S. is the principal market for Atlantic Canada's groundfish production. Since the fishing industry exists to satisfy consumer wants, the chain of market transactions begins with the consumer. The demand for fish in the port market, in other words, is a derived demand. It derives from the demand for fish products in wholesale and retail markets. Price formation, then, starts at the retail level. Prices act as signals to wholesalers and in turn to processors indicating what types of fish products are desired and whether to increase or decrease supply of a particular product.

Vertically integrated processing companies respond to these signals by simply directing the level and timing of fishing effort of their vessels to particular species. The ability of companies to respond in this way is facilitated by the system of enterprise allocations in effect since 1982. Since companies do not compete among themselves for raw material, quality can be taken into consideration through the price structure. To date, though, only one company has adopted a quality-based pricing system.

The matter is not so straightforward for processors dealing with independent inshore fishermen. They do not have the same degree of control over supply as the integrated companies. Under competitive conditions, they would be expected to transmit prices reflecting consumer demands to fishermen through an appropriate set of port market prices. These prices would be expected to influence all aspects of fishing behaviour including fish quality, the timing of landings and the quantities of each species caught.

The sale of fish in port markets is transacted using methods varying by species, region and fleet sector. The transactions fall into one of two categories, market and non-market. Market transactions are ones where prices have the potential to be sensitive to day-to-day changes in final product markets. These include direct sales between processors and nominally independent fishermen, blind hail auctions, and collective agreements with provisions for variable prices. Non-market transactions are ones where prices do not have the potential to be sensitive to day-to-day changes in final product markets. These include sales subject to fixed prices specified in collective agreements, sales at fixed prices within vertically integrated companies, contract sales with fixed prices, and pre-season prices with post-season adjustments.

An analysis of landings by gear type and fleet sector suggests that about one-third of the total quantity of finfish and shellfish involved in ex-vessel sales transactions in Atlantic Canada falls into the market transactions category, while about two-thirds falls into the non-market category. There are wide variations by species group. For groundfish, the most important species group in the region, only about 30 percent of landings by quantity is sold through market transactions. In other words, the potential for port market prices to be sensitive to day-to-day changes in final product markets is limited to only about 30 percent of ex-vessel groundfish sales.

A detailed analysis of price movements in one hundred port markets in Atlantic Canada reveals considerable annual and seasonal price stability. In Newfoundland, this stability is explained by the non-market nature of transactions. But even in ports in the rest of Atlantic Canada where fish is bought and sold subject to market transactions, prices exhibit considerable stability. In an industry characterized by high buyer concentration and strong buyer-seller ties, this should not be too surprising. Buyer-seller ties are particularly important in minimizing the degree of price competition, and thereby reducing the economic significance of so-called market transactions. Market structure ensures that when prices change they do so in a controlled fashion with regional or local area control imposed either through price leadership by the larger inshore processors, or through informal agreements among a number of processors. Contrary to a widely held view, the vertically integrated companies appear to have little, if any, influence on market-determined inshore prices in most areas.

Port Market Effectiveness

While full-fledged price competition is the exception, meaningful price competition nonetheless occurs in port markets. The pattern of seasonal and annual price movements in ports in southwest Nova Scotia provide strong evidence of price competition. The evidence is strongest in the case of haddock. Among the factors that appear to explain price behaviour in these ports are relatively low buyer concentration, local demand and supply conditions, proximity to final product markets, and a keen awareness by both processors and fishermen of conditions in final product markets. High prices for fresh fish in the U.S. market appear to have been particularly important in inducing competitive behaviour.

Almost without exception, even in ports exhibiting competitive pricing behaviour, the port market structure has inhibited the development of a pricing system that recognizes and rewards differences in quality. Three reasons may be put forward for this. First, the private costs of establishing and maintaining a mutually acceptable grading system are high. Second, many processors find themselves in the position of having to buy all fish at a single price regardless of quality or risk losing supply. Buyer-seller ties may be stable, but beyond a certain point differences in price will not be tolerated. Third, the management and licensing system severely constrain the ability of the fisherman to respond to quality-based prices, even if offered.

In only a few study ports is there a statistically significant relationship between landed prices and fresh fish prices in the New England market. These ports are confined primarily to the Scotia-Fundy Region, and more specifically to southwest Nova Scotia. While the relationships are significant, in only one or two cases are there what might be regarded as relatively strong correlations. In general, the price relationships are stronger for haddock, a species with a relatively limited range of product forms, than cod. The results suggest that at best, port market prices are responsive to long-term trends in the New England market, but are not responsive to short-term fluctuations.

Two factors account for the lack of responsiveness. First, market structure tends to inhibit price competition at the port level. Second, in situations where decisions to adjust the price paid to fishermen depend on changes in prices in the new England market, buyers are likely to wait until that price change has been sustained long enough to confirm whether it is a real rather than a temporary movement. This concern stems from the uncertainty over the meaning of prices established on the Boston auction. These prices are influenced by many factors, not simply supply and demand. These other factors undermine the value of the auction as an indicator of the overall state of the market.

Even if port prices were more responsive to day-to-day changes in product markets, the evidence suggests fishermen would not react to these changes by adjusting fishing behaviour. The global quota system encourages the fisherman to catch as much as possible as fast as possible, thus effectively preventing the fisherman from timing effort in response to price signals.

The introduction of fish auctions patterned on the European model would probably improve the effectiveness of the port market mechanism. One of the main advantages of the auction system is that it is straighforward: buyers compete openly and prices are established in accordance with supply and demand. Another advantage is its ability to dispose rapidly of fresh fish; market determined prices automatically adapt to variable landings. In the auction system, the way in which choice is made by the buyer closely approximates the quality grading and sorting that occurs under an elaborate classification system. The auction system ensures the best quality receives the best price.

Any attempt to introduce auctions in Atlantic Canada would meet with considerable difficulty, not simply because communities are conservative and would resist change, but also because in most areas the circumstances are not conducive to this method of transacting the sale of fish. Two of the critical conditions necessary to support an auction are a significant quantity of landings, with some regularity throughout the year, and a strong demand for fresh fish. These conditions are found in only a few ports in southwest Nova Scotia, and even then, the market for fresh fish is in the U.S., not Canada. The decision to participate by fishermen and processors would be based on their assessment of the relative merits of the auction system compared with the existing system. The conservatism of fishermen and processors coupled with the very real possibility they would find themselves worse off, suggest any attempt to introduce an auction would meet with considerable resistance.

SOMMAIRE À L'INTENTION DE LA DIRECTION

Structure Industrielle

La structure industrielle joue une part importante dans la détermination des prix dans les marchés portuaires. Celle-ci est généralement définie en termes du nombre et de l'importance des vendeurs et des acheteurs, du type de relations entre eux, et des conditions d'entrée et de sortie. Le nombre et l'importance des acheteurs et vendeurs donne une indication de leur pouvoir dans le marché ainsi que de l'étendue de la compétition par les prix. L'existence d'intégration verticale et de liens officieux isole vendeurs et acheteurs et empêche la compétition. La liberté d'entrée et de sortie forme la base du comportement compétitif. Les barrières à l'entrée et à la sortie diminuent les possibilités de comportement compétitif.

La structure des marchés portuaires varie dans le Canada atlantique mais peut être décrite comme oligopsoniste ou monopoliste (bilatéral). Les ports côtiers des Maritimes et du Québec sont de nature oligopsoniste. La plupart des ports ont entre un et trois acheteurs, l'acheteur le plus important acquérant près de 90 pour cent des ventes. D'autre part, le groupe de vendeurs est typiquement constitué de plusieurs pêcheurs indépendants trop petits pour influencer le marché. La structure du marché portuaire de Terre-Neuve ressemble davantage à un monopole bilatéral, les prix minimums étant établis par des conventions collectives entre les transformateurs de poisson et les syndicats de pêcheurs. La concentration des acheteurs est élevée mais la syndicalisation a pourvu les pêcheurs d'un pouvoir de négociation. Dans les ports de pêche hauturière du Canada atlantique, les "vendeurs" sont membres de compagnies verticalement intégrées et n'ont pas l'indépendance nécéssaire pour opérer de façon compétitive.

Les liens entre vendeurs et acheteurs sont importants dans la pêche côtière et hauturière. Le secteur hauturier est intégré verticalement; les usines de transformation possèdent les vaisseaux utilisés pour la pêche et fournissent une grande partie des besoins en matériel. La conséquence principale de l'intégration verticale sur la determination des prix est que les débarquements sont promis au propriétaire du vaisseau et ne sont donc pas sujet à compétition de la part des autres acheteurs. Les contraintes structurelles sur la compétition par les prix sont renforcées par les arrangements contractuels (conventions collectives dans la plupart des cas) entre propriétaires et pêcheurs. Dans le secteur de la pêche côtière les liens entre vendeurs et acheteurs sont de dépendance mutuelle. Le pêcheur consent à vendre son poisson à un certain transformateur en échange de l'assurance que celui-ci achètera tout son chargement (au prix du marché) et fournira une gamme de services tels manutention, transport, etc. Ces liens sont suffisamment forts et stables pour empêcher presque toute compétition par les prix dans la plupart des marchés portuaires.

Il existe plusieurs obstacles importants à l'entrée dans la pêche et la transformation du poisson. La barrière la plus importante est le système des permis de pêche. Depuis 1973, aucun nouveau bateau a été autorisé pour la pêche hauturière. Dans le secteur côtier, le système des permis de pêche restreint l'accès à la pêche depuis 1980. Des restrictions similaires n'existent pas dans le secteur de transformation du poisson. Cependant, les besoins en capitaux et les difficultés liées à l'obtention de quantités suffisantes de poisson ont jusqu'à maintenant tenu lieu de barrière à l'entrée dans l'industrie de la transformation.

Bien que l'industrie des pêches n'offre que des revenues marginaux à ses participants, plus de facteurs incitent à rester dans l'industrie qu'à la quitter. Il y a peu d'emplois alternatifs pour les pêcheurs et leurs bateaux. De plus, une variété de programmes offrant de l'aide financière ainsi que non-financière contribuent à maintenir l'attrait de l'industrie pour ses participants. A long terme, les barrières à la sortie des pêcheurs pourraient avoir un effet négatif sur les prix, tandis que les barrières à la sortie des transformateurs pourraient avoir l'effet opposé; l'effet net est ambigu.

Comportement des Prix

Le marché portuaire n'est qu'un des nombreux maillons dans la chaîne de transactions qui relie l'océan au consommateur. Les Etats-Unis sont le marché le plus important pour le poisson de fond du Canada atlantique. Etant donné que l'industrie de la pêche vise tout d'abord à satisfaire le consommateur, la chaîne de transactions commence au consommateur. En d'autres termes, la demande portuaire pour le poisson est une demande dérivée. Elle est dérivée de la demande pour le poisson dans le marché de gros et de détail. La determination des prix se fait donc au niveau du détail. Les prix indiquent aux grossistes et aux transformateurs quels types de produit de poisson sont désirés, et si la quantité d'un certain produit doit être augmentée ou réduite.

Les compagnies de transformation verticalement intégrées répondent à ces signaux en adjustant l'effort dirigé par leurs bateaux de pêche, réponse qui été facilité depuis 1982 par le système d'allocations de quotas de pêche à chaque entreprise. Puisque les compagnies ne se font pas compétition pour la matière brute, la qualité peut être récompensée par des prix plus élevés. Jusqu'à date, une seule compagnie a adopté un système de prix basé sur la qualité.

Les tranformateurs de poissons qui achètent des pêcheurs côtiers n'ont pas autant de contrôle sur l'offre. Dans un marché compétitif, ils pourraient transmettre la demande de détail en offrant les prix appropriés. Ces prix influenceraient la qualité du poisson, les dates de débarquements et la quantité attrapée de chaque espèce.

La vente de poisson dans les marchés portuaires se fait par des méthodes qui varient selon la région, les espèces et le type de flotte (côtière ou hauturière). Les transactions peuvent s'effectuer à l'intérieur ou à l'extérieur du marché. Dans les transactions de marché, les prix sont potentiellement sensibles aux changements quotidiens qui se produisent dans les marchés de produits finaux. Les transactions de marché incluent les ventes entre transformateurs et pêcheurs indépendants, les ventes à l'encan, et les conventions collectives tenant compte de la variation des prix. Les transactions hors-marché sont celles où les prix ne peuvent répondre aux changements quotidiens dans les marchés de produits finaux. Celles-ci incluent les ventes sujettes à des prix fixés lors de conventions collectives, les ventes à prix fixes effectuées à l'intérieur de compagnies verticalement intégrées, les ventes à contrat avec prix fixes ou prix fixés en début de saison et ajustés après la saison.

Une analyse des débarquements par types d'agrès et de flotte suggère qu'environ un tiers de la quantité totale de poissons pélagiques et de crustacés vendus hors-vaisseau (ex-vessel) dans le Canada atlantique sont vendus à l'intérieur du marché alors que environ deux tiers sont vendus à travers des transactions hors-marché. Pour les poissons de fond, l'espèce la plus importante de la région, seulement 30 pour cent des débarquements est échangé sur un marché. En d'autres termes, seulement 30 pour cent des ventes de poisson de fond sont potentiellement sensibles aux variations quotidiennes qui se produisent dans les marchés de produits finis.

Une analyse détaillée du mouvement des prix dans 100 marchés portuaires du Canada atlantique révèle une stablité des prix saisonière et annuelle. A Terre-Neuve, cette stabilité s'explique par la nature hors-marché des transactions. Mais même dans les ports du reste du Canada atlantique où le poisson est vendu et acheté à l'intérieur du marché, les prix demeurent stables. Dans une industrie characterisée par une grande concentration d'acheteurs et de forts liens entre acheteurs et vendeurs, ceci ne devrait pas être trop surprenant. Les liens entre vendeurs et acheteurs sont une cause importante de la diminution du degré de compétition par les prix, et par conséquent réduisent la signification économique des transactions de marché. La structure du marché assure que quand les prix changent, ils le font de façon contrôlée, le contrôle s'effectuant de façon locale ou régionale sous la direction des transformateurs côtiers ou à travers des ententes informelles entre un certain nombre de transformateurs. Contrairement à l'opinion générale, les compagnies verticalement intégrées semblent avoir très peu d'influence sur les prix côtiers déterminés à l'intérieur du marché.

Efficacité du Marché Portuaire

Bien que la compétition par les prix soit exceptionelle, elle existe tout de même. Les mouvements de prix saisoniers et annuels dans les ports du sud-ouest de la Nouvelle-Ecosse suggèrent fortement la présence de compétition par les prix. C'est le cas notamment de l'aiglefin. Parmis les facteurs qui semblent expliquer ce comportement des prix sont la faible concentration des acheteurs, les conditions d'offre et de demande locales, la proximité de marchés de produits finis ainsi qu'une conscience aigüe des conditions présentes dans les marchés de produits finis. Les prix élevés pour le poisson frais dans les Etats-Unis semblent avoir incité un comportement plus compétitif.

Dans presque tous les ports, la structure des marchés portuaires a freiné le développement d'un système de prix qui reconnaîtrait et récompenserait les différences de qualité. Trois raisons sont mentionnées. Premièrement, les coûts privés d'établissement et de maintien d'un sytème de classification sont élevés. Deuxièmement, plusieurs transformateurs se voient obligés d'acheter tout le poisson offert à un prix unique au risque de perdre un vendeur. Malgré la stabilité des liens entre vendeurs et acheteurs, ces liens peuvent cependant se dissoudre si une certaine différence entre les prix apparait. Troisièmement, le système de gestion de la pêche et de délivrance des permis ne permet guère aux pêcheurs de répondre à des prix basés sur la qualité, même si ceux-ci sont offerts.

Une relation significative entre les prix au débarquement et le prix pour le poisson frais en Nouvelle-Angleterre n'existe que dans quelques-uns des ports étudiés. Ces ports se trouvent pour la plus part dans la région de Scotia-Fundy, et plus particulièrement dans le sud-ouest de la Nouvelle-Ecosse. Bien que certaines relations soient statistiquement significatives, celles-ci ne sont fortement significatives que dans un ou deux cas. En général, ces relations entre les prix sont plus fortes pour l'aiglefin, une espèce ayant une gamme de produits plus limitée que la morue. Les résultats suggèrent tout au plus que les prix des marchés portuaires suivent les tendances à long-terme du marché de la Nouvelle-Angleterre, mais qu'ils ne répondent pas aux variations à court terme.

Deux facteurs explique cette faible relation. Premièrement, la structure du marché portuaire tend à étouffer la compétition par les prix. Deuxièmement, dans les cas où un changement de prix est relié à des changements de prix dans le marché de la Nouvelle-Angleterre, les acheteurs ont tendance à attendre pendant une période de temps assez longue pour déterminer si le changement est réel ou temporaire. Ceci est du à l'incertitude qui règne par rapport aux prix établis à la vente à l'encan de Boston. Ces prix sont influencés par d'autres facteurs que les seuls mouvements de l'offre et de la demande. Ces facteurs amoindrissent la valeur de la vente à l'encan comme indicateur de l'état général du marché.

Même si les prix portuaires étaient plus sensibles aux changements quotidiens du marché, il semble que les pêcheurs ne changeraient pas de méthodes de pêche. Le système de quota global pour la flotte côtière encourage les pêcheurs à prendre le plus de poissons possible, le plus rapidement possible. Ceci a pour effet d'empêcher les pêcheurs de contrôler leur effort en fonction des signaux donnés par les prix.

L'introduction d'enchères semblables à celles rencontrées en Europe pourrait peut-être accroître l'efficacité du marché portuaire. Un avantage important des enchères est la simplicité; les acheteurs se font concurrence de façon ouverte et les prix sont déterminés par l'offre et la demande. Un autre avantage est la possibilité de disposer du poisson frais rapidement; les prix déterminés par le marché s'adaptent automatiquement aux différents débarquements. Lors d'enchères, le choix exprimé par les acheteurs est équivalent à un système de classification et le poisson de meilleure qualité reçoit le meilleur prix.

Toute tentative d'introduction d'enchères pour le poisson dans le Canada atlantique rencontrerait de grandes difficultés, non seulement parce que les communautés visées sont conservatrices et résisteraient au changement, mais aussi parce que les conditions propices à leur établissement n'y existent pas. Deux des conditions nécéssaires sont une grande quantité de débarquements, plus ou moins réguliers au long de l'année, et une forte demande pour le poisson frais. Ces conditions ne se retrouvent que dans quelques ports du sud-ouest de la Nouvelle-Ecosse, et le marché n'est pas le Canada, mais les Etats-Unis. La décision de participer des pêcheurs et transformateurs serait basée sur les mérites relatifs des enchères par rapport aux mérites du système actuel. Le conservatisme des pêcheurs et transformateurs et la possibilité réelle qu'ils ne bénéficieraient pas d'un tel changement suggèrent que toute tentative d'introduction rencontrerait une résistance considérable.

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CHAPTER ONE
INTRODUCTION

1. Study Objectives

This study is concerned with the economic efficiency of the price-setting mechanism in port markets in Atlantic Canada. Port market is the term used to refer to the landing sites where dockside transactions to buy and sell fish take place. The price-setting mechanism is considered economically efficient if prices are set through competitive behaviour between buyers and sellers. If prices are set competitively, then port markets fulfill their economic role and transmit appropriate signals to fishermen with respect to quality, quantity and species mix.

There are approximately 1,650 port markets in the region. The bulk of the fish is bought directly or indirectly by the region's 350 or so processing companies providing raw material for about 600 fish plants of various types and sizes. The sellers are the approximately 20,000 active fishing enterprises (vessels) in the region. The transactions are conducted under a range of competitive conditions given by varying market structures and circumstances.

The focus of this study is groundfish, in terms of tonnage, the most important species in the Atlantic region. Among the issues of interest is fish quality. The quality of fish products, mainly products made from groundfish, has been a matter of concern in the Atlantic fisheries for some time. Product quality is a function of several factors including:

- the seasonal quality of the raw material;
- fish handling practices at sea;
- dockside handling practices;
- storage methods prior to processing; and,
- plant workmanship.

The *Task Force on Atlantic Fisheries* (hereafter referred to as the *Task Force*) pointed to a close association between the operation of port markets and handling practices at sea. It noted, "One of the most perplexing phenomena in the fishery is that the apparent market preference for high-quality fish fails to be transmitted to the fishermen in the form of appropriate price incentives".[1] Port markets were described by the *Task Force* as not being "orderly". Such factors as port market structure, the behaviour of buyers and sellers, the seasonality of the fishery and the common property nature of the resource were cited as inhibiting the formation of appropriate quality-based price differentials at dockside and the timely delivery of the optimum quantity and quality of fish. Among the more specific factors affecting prices and the quality and quantity of fish exchanged, the *Task Force* cited:

- fish perishability;
- the volume orientation of processors;
- buying concentration;
- fisherman-processor ties; and,
- collective bargaining.

While the discussion of port markets in the *Task Force* report was thorough, the observations made were not based on a systematic, quantitative analysis of their structure and the behaviour of buyers and sellers. This study is intended to fill this gap. Its main objectives are to:

- gain a better understanding of the structure and operation of port markets;
- assess whether port markets are effective in bringing about an optimal mix of species and quality; and,
- provide a preliminary assessment of the advantages and disadvantages of fish auctions as an alternative to the current port market mechanisms.

2. Methodology

Market Structure and Price Behaviour

Port markets operate as one link in the chain of market transactions and processes required to move fish from the ocean to the ultimate consumer. A highly simplified description of the harvesting-processing-marketing-distribution chain is illustrated in Figure 1-1. The ultimate aim is to satisfy a consumption want, so the links in the chain begin with the consumer. Price formation starts at the retail level. Price information then works its way down the chain through the wholesale level to the processor level and finally reaches the port market. The final result is a supply of fresh, frozen and more highly processed fish products available at the retail level at prices consumers are willing to pay.

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[1] Task Force on Atlantic Fisheries, *Navigating Troubled Waters, A New Policy for the Atlantic Fisheries*, 1982, p. 258.

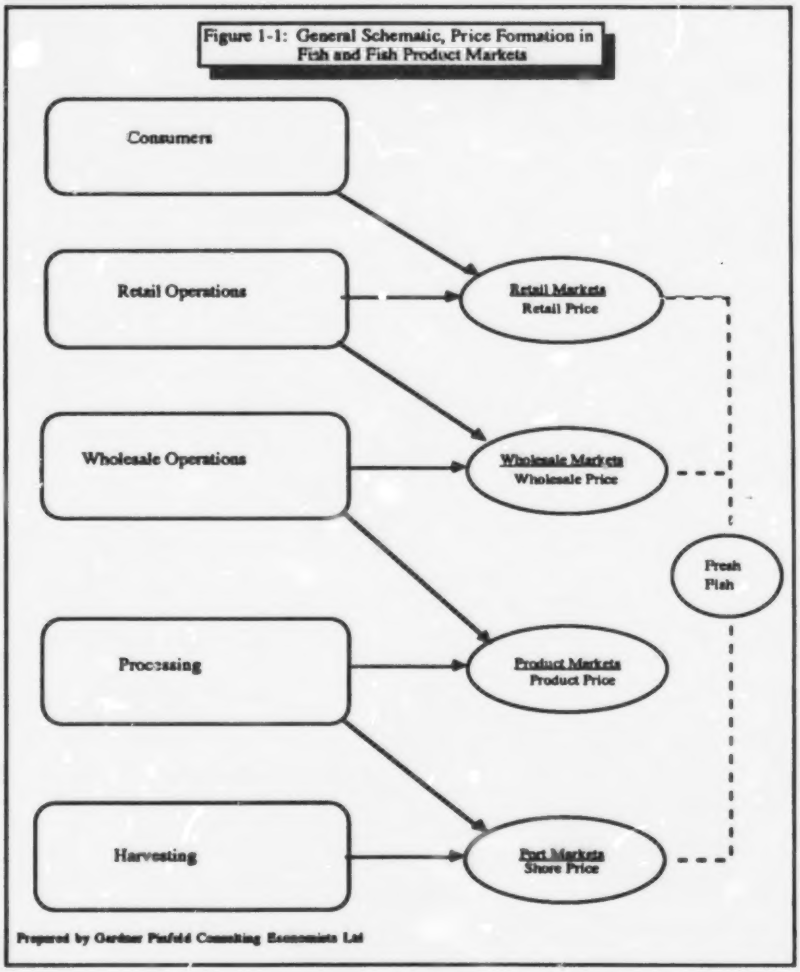


Figure 1-1: General Schematic, Price Formation in Fish and Fish Product Markets

Consumers
Retail Operations
Retail Markets
Retail Price
Wholesale Operations
Wholesale Markets
Wholesale Price
Fresh Fish
Processing
Product Markets
Product Price
Harvesting
Port Markets
Shore Price

Prepared by Gardner Pinfold Consulting Economists Ltd

For Atlantic Canada, the United States is the dominant market. The retail and wholesale prices illustrated in Figure 1-1 are effectively determined in the United States. The demand for fish product is derived from the wholesale market and revealed to processors. Competition among processors to satisfy the wholesale demand establishes product prices at the processor level. The processors express their demand for raw fish in the port markets. To an increasing degree in recent years, a demand for fresh fish from the wholesale level also feeds directly into the port markets. The supply of raw fish is provided by the fishermen. The landed or shore price is then established by the interactions between supply (the fishermen) and demand (the processors and the buyers representing the wholesale level directly).

The primary concern of this study is port market price behaviour and its effect on fishing behaviour. A major consideration in this regard is the structure of the port markets that make up the fishing industry. The branch of economics called industrial organization typically adopts a 'structure-behaviour-performance' method of analysis for assessing industry level economic activity. That approach is used in this study.

Market structure refers to those industry characteristics that determine how buyers and sellers compete and interact with one another. The *structure analysis* examines the concentration among buyers (processors) and sellers (fishermen) in port markets, vertical integration and other buyer-sellers ties, and entry and exit conditions on both sides of the market. The analysis identifies the most important factors bearing on the economic behaviour of the port market participants. The findings provide important information for explaining price (and investment) behaviour in the industry.

In this study, attention is concentrated on price behaviour. The *behaviour analysis* uses the port structure characteristics to explain and interpret the observed port price behaviour. Investment behaviour falls outside the terms of reference and is discusssed only to the extent that it relates to price behaviour.

Performance analysis is usually concerned with matters of economic efficiency and equity. Efficiency refers to the extent to which costs are minimized and product values are maximized. In other words, are the potential economic rents associated with the resource fully realized? Equity concerns the distribution of income in the industry and is judged according to how well the actual distribution conforms to some predetermined standard. The analysis of these issues is confined largely to how performance is affected by price behaviour. Cost considerations are analyzed only to the extent that conclusions can be drawn from logical analysis applied to existing information.

Methods of Price Formation

Various methods are used to effect the buyer-seller transaction. The methods tend to vary by species, region and fleet sector (inshore or offshore). Among the methods used are:

- prices negotiated on a day-to-day basis;
- contract sales;

- sales subject to prices specified in collective agreements;
- blind hail auctions;
- pre-season price agreements with post-season adjustments; and,
- notional prices established within vertically integrated companies.

Essentially these mechanisms fall into one of two categories: methods that have the potential to be sensitive to price fluctuations in wholesale or retail markets (market transactions), and methods that do not have such potential (non-market transactions). The significance of port market price signals is determined largely by the transaction method used. In this study we are concerned primarily with sales of fish effected through the former methods. To provide an indication of the proportion of total landings falling into this category, the volume and value of sales by the various methods are estimated using 1983 landings data.

Port Market Price Behaviour

A major objective of this study is to evaluate the efficiency of the port market price mechanism. A port market pricing mechanism is judged to be efficient if it transmits information regarding changes in consumer demand expressed in the retail and wholesale markets correctly and quickly to fishermen via appropriate price changes. Such changes may be related to the mix of species demanded, the quality and quantity of raw fish or fish product, and the type of fish product demanded (fresh, frozen, cooked, etc).

Port market price behaviour is examined first in terms of the price level and price movements exhibited by groundfish and lobster in Atlantic Canada ports. General factors affecting prices are noted and the importance of the United States market for fish products is discussed in particular. For the study sample ports, port market price behaviour is analysed on an inter-regional and an intra-regional basis using DFO's four administrative regions in Atlantic Canada: Newfoundland, Scotia-Fundy, Gulf, and Quebec. The study ports were selected using location and relative isolation, number of processors/buyers, number of vessels/sellers, volume and value of landings and species landed as criteria.[2]

Two models of price behaviour are tested for their explanatory power. One assumes the offshore and inshore sectors operate independently, each determining their prices according to the degree of price competition present in the sector. According to this model, inshore prices are set competitively in many ports. The other model treats the inshore and offshore sectors as a horizontally integrated system linking port markets through a network of buyers. Strong price leadership and buyer-seller ties are instrumental in price determination. In this report, inter-regional and intra-regional price similarities and differences are identified and analysed by species for the offshore and inshore fleet sectors. Where differences are identified, they are explained in terms of regional differences in the characteristics of the fishery, institutional pricing arrangements and industry structure.

---

[2] This is called a deductive approach. An alternative inductive approach was considered. Under the alternative, ports for further study would be selected from a random sample of all Atlantic Canada ports, according to whether their prices exhibit a strong positive correlation with U.S. prices. The deductive approach was adopted following preliminary analysis of catch and value data, a review of the sales methods, and interviews with DFO officials and fish processors.

A second important element of the analysis is to identify and estimate the strength of the association between U.S. prices and Canadian port market prices. The null hypothesis for this work is that a positive relationship should exist given the predominant position of the U.S. as a market for Canadian fish products. The hypothesized price relationship is tested separately for the individual study ports by estimating simple correlation coefficients between weekly U.S. prices and average weekly port market prices. The Boston blue sheet is used as a source for the U.S. price data.

A positive price relationship is regarded as evidence that a port market does transmit market information to fishermen. For those ports exhibiting a positive price relationship, the influence on fishing behaviour is assessed by a correlation analysis of prices and landings. The findings are interpreted in terms of factors such as the common property nature of the resource, the seasonal pattern of landings, quotas, licensing and other regulations.

Alternative Mechanisms for Price Formation

A second objective of the study is to assess the advantages and disadvantages of fish auctions as an alternative to the current methods of price formation in port markets. The relevance of auctions in the Canadian context is assessed by investigating the auction mechanism in selected European ports. The comparative assessment of the Canadian and European price setting mechanisms is approached from institutional, market and industry perspectives. The critical issue examined is whether the conditions accounting for the success of auctions in Europe are present in the Atlantic Provinces. Among the elements of the auction mechanism that are examined are:

- the frequency of auctions;
- the proportion of landings sold through auction;

- the number and size of ports where auctions are held;
- the actual mechanics of the auction process;
- the criteria used to establish quality;
- the factors affecting price;
- the extent of the market area served by each auction; and,
- the number of buyers and sellers.

A general description of the market organization and the complex pricing regime in place in the EEC is provided as important background to the analysis of the role of auctions in price formation. The data for the analysis were collected from primary and secondary sources and prepared to allow direct comparison with the Boston auction.

3. The Atlantic Canada Fishery

Fishing Areas

The Atlantic Canada fishery extends from Davis Strait in the north to Georges Bank in the south, and includes the waters of the Gulf of St. Lawrence. The fishery is conducted almost exclusively within Canada's 200-mile fisheries conservation zone. The zone and its statistical subareas and divisions are illustrated in the map in Figure 1-2.

Fishing effort and landings by Atlantic Canada's fishermen are concentrated in the waters off Newfoundland (Subarea 3) and Nova Scotia (Subarea 4). The distribution of catch by quantity and subarea, 1975-1983, is shown in Figure 1-3.

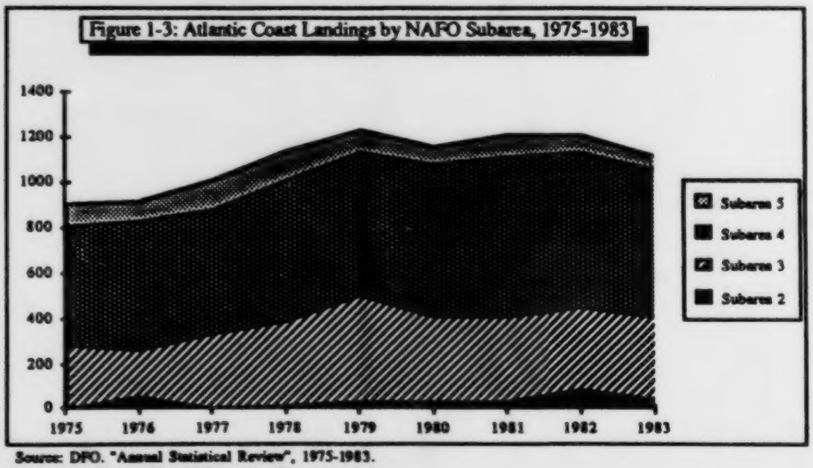
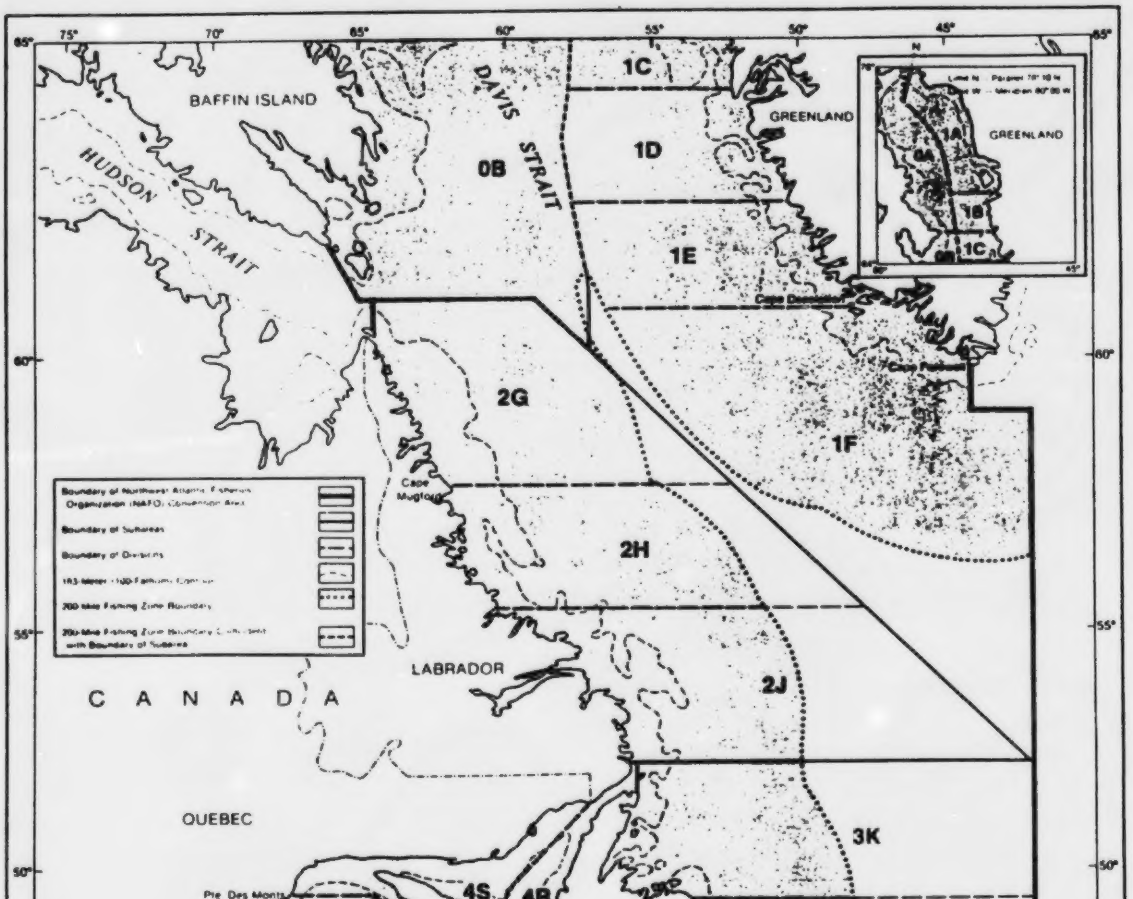


Figure 1-3: Atlantic Coast Landings by NAFO Subarea, 1975-1983

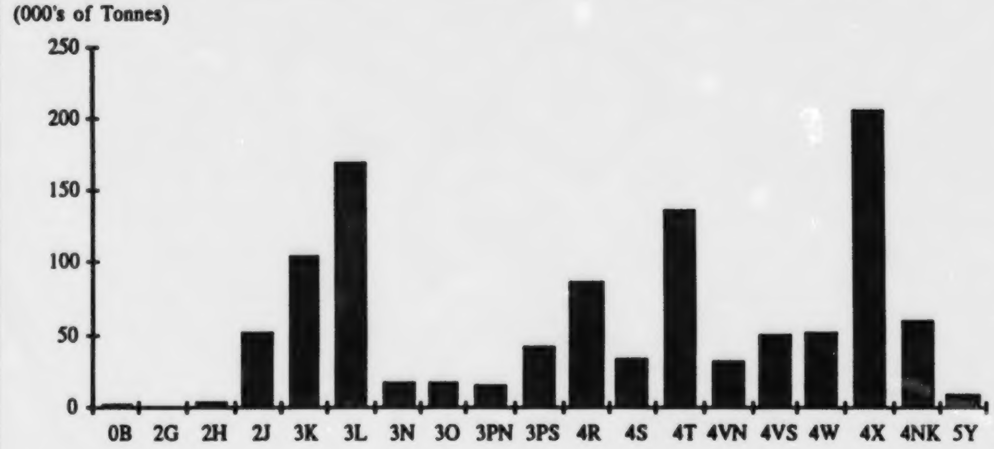
Source: DFO. "Annual Statistical Review", 1975-1983.
Prepared by Gardner Pinfold Consulting Economists Ltd.

Figure 1-2: NAFO Subareas and Divisions


75°
70°
65°
60°
55°
50°
45°
65°
60°
55°
50°
45°
40°
35°
BAFFIN ISLAND
HUDSON STRAIT
DAVIS STRAIT
0B
1C
1D
1E
1F
GREENLAND
Cape Desolation
Cape Farewell
0A
1A
1B
2G
Cape Mugford
2H
2J
LABRADOR
C A N A D A
QUEBEC
Boundary of Northwest Atlantic Fisheries Organization (NAFO) Convention Area
Boundary of Subareas
Boundary of Divisions
183-Meter (100-Fathom) Contour
200-Mile Fishing Zone Boundary
200-Mile Fishing Zone Boundary Coincident with Boundary of Subareas
3K
Pte. Des Monts
4S
4R
NEWFOUNDLAND
Gulf of St. Lawrence
4T
P.E.I.
3Pn
Miquelon I.
Saint Pierre I.
3L
Grand Bank
Flemish Cap
NEW BRUNSWICK
4Vn
3Ps
3-O
3M
ONT
MAINE
U S A
VT
N H
NEW YORK
MASS
CONN
R I
PA
N J
NOVA SCOTIA
Sable I.
5Y
Nantucket I.
5Zw
5Ze
6A
4X
4W
4Vs
3N
A T L A N T I C
O C E A N
6B
6C
6D
6E
6F
6G
6H

Though there has been considerable fluctuation over the years in the size of the catch from specific divisions within these subareas, certain divisions are consistently more prolific than others. Among these are division 4X off southwest Nova Scotia, divisions 3K and 3L off eastern Newfoundland, and division 4T in the Gulf of St. Lawrence. Together, these divisions accounted for over 50 percent of landings in 1983. Landings by division for 1983 are depicted in Figure 1-4.

Figure 1-4: Atlantic Coast Landings by NAFO Division, 1983

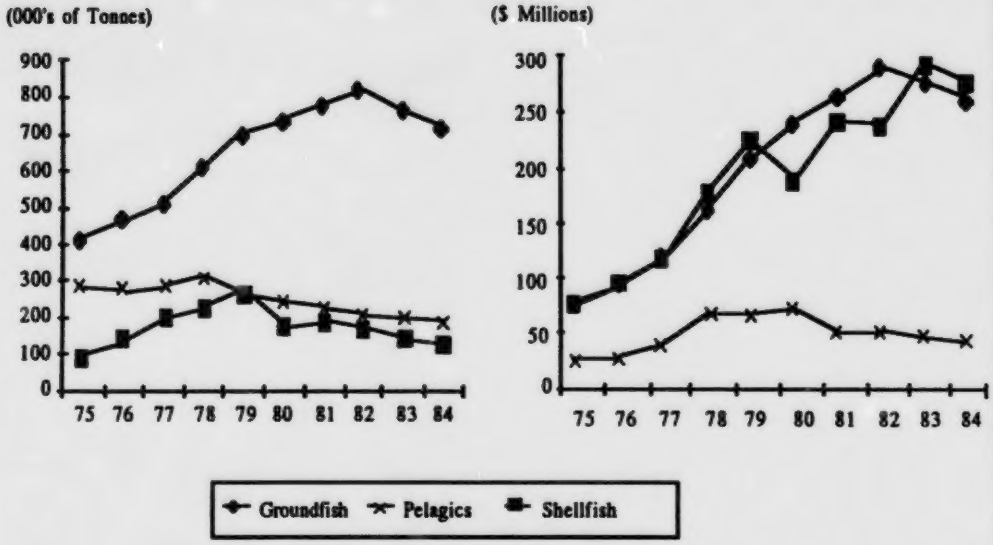


Source: DFO, "Annual Statistical Review", 1983.
Prepared by Gardner Pinfold Consulting Economists Ltd.

Species Harvested

Fishermen in Atlantic Canada harvest approximately 50 groundfish, pelagic and shellfish species. Groundfish is the most important species group, in recent years accounting for about 70 percent of landings by quantity and 40-50 percent by value. Shellfish, while contributing only 10-15 percent of quantity, has accounted for 40-45 percent of total value in recent years. Trends in the quantity and value of landings by species group, 1975-1984, are shown in Figure 1-5.

Figure 1-5: Quantity and Value of Atlantic Coast Landings by Major Species Group, 1975-1984



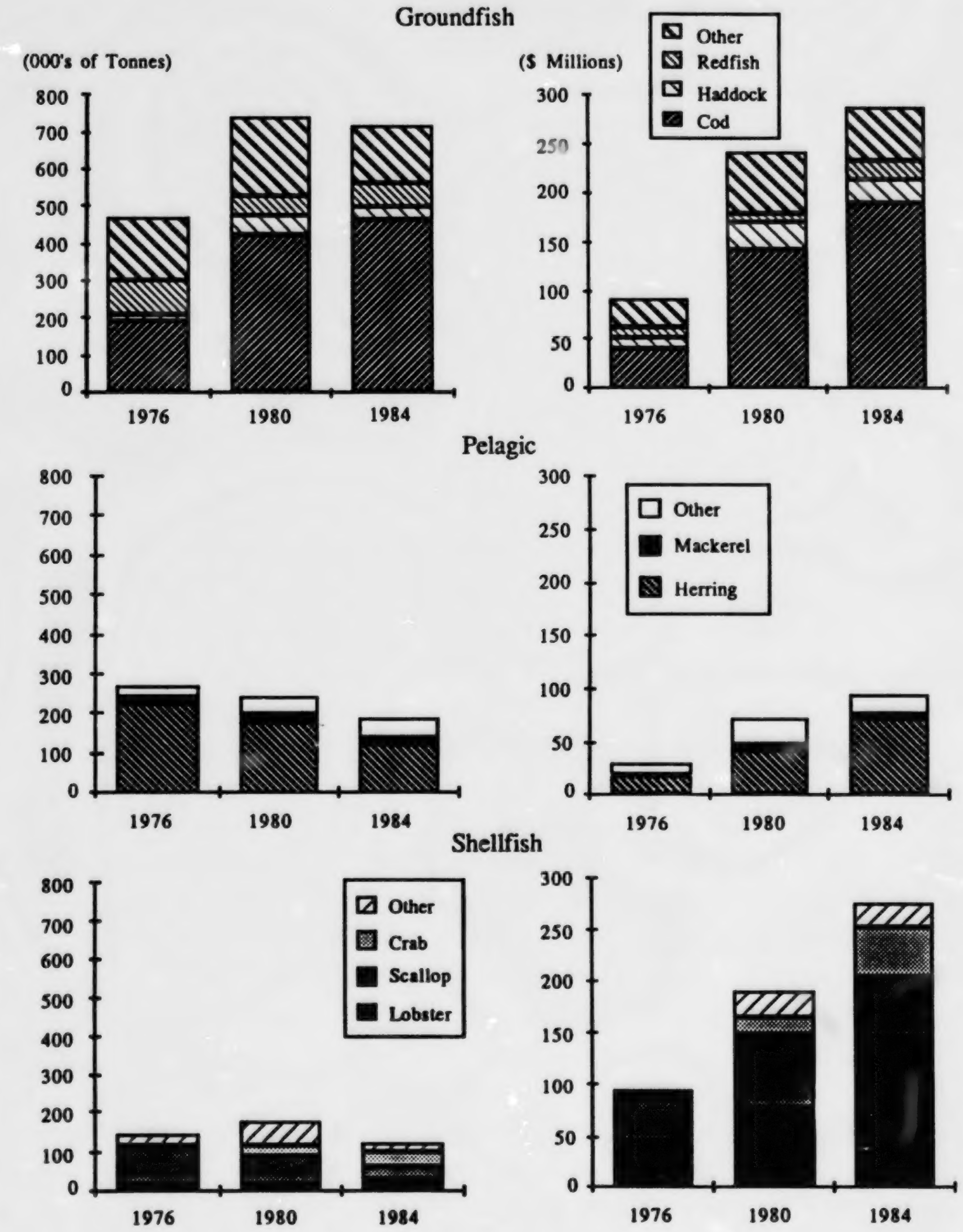
Source: DFO, "Annual Statistical Review", 1975-1984.
Prepared by Gardner Pinfold Consulting Economists Ltd.

Cod is by far the most important species harvested, in recent years accounting for up to 50 percent of total quantity and in the range of 30 percent of value. Herring is the next most important species by quantity (10-15 percent), though it tends to be a relatively minor species by value (about 5 percent). The opposite is the case with lobster; while quantity has been steady over the past few years (2-3 percent), value has risen substantially (up from 15 percent in 1980 to 25 percent in 1984). The relative importance of principal species for selected years, 1976-1984, is illustrated in Figure 1-6.

The Harvesting Sector

The Atlantic Coast fishery is comprised of some 30,000 registered vessels of various sizes and types. The fleet traditionally is divided into two sectors, inshore and

Figure 1-6: Quantity and Value of Atlantic Coast Landings by Species



Source: DFO, "Annual Statistical Review", 1976, 1980, 1984.
Prepared by Gardner Pinfold Consulting Economists Ltd.

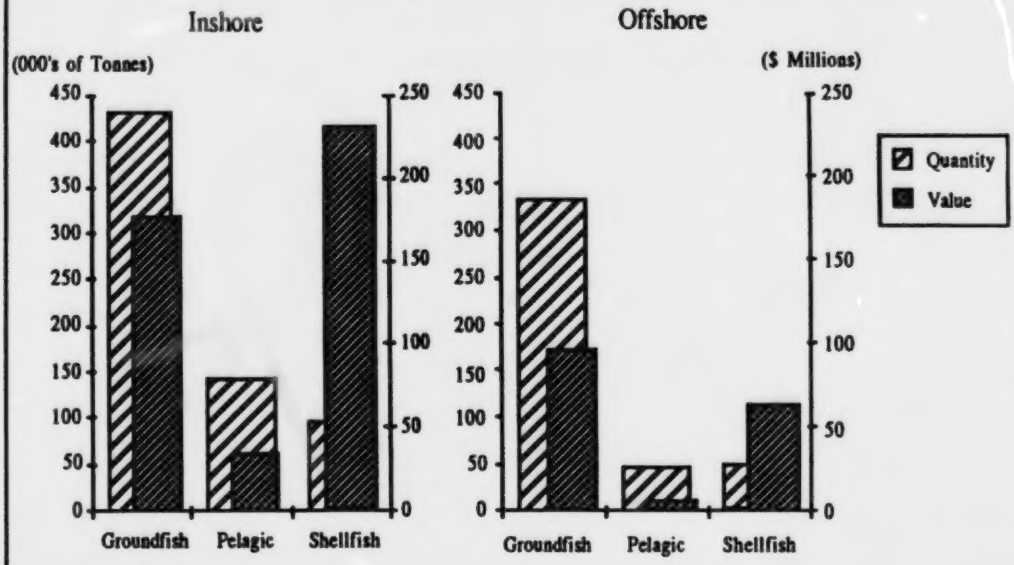
offshore, with the distinction based mainly on such factors as vessel size, time spent at sea and distance of operations from shore. The distinction has become blurred over the years with the emergence of a class of medium-size vessels capable of fishing in offshore waters. These vessels are commonly classified as nearshore or midshore depending essentially on length. For regulatory purposes (having to do with licensing, quotas, area of operations and vessel replacement) vessels are categorized by length as follows (tonnage ranges are approximate):

	Length (m)	*Tonnage (GRT)*
Inshore		
inshore	$l < 13.7$	$w < 25$
nearshore	$13.7 \leq l < 19.8$	$25 \leq w < 50$
Offshore		
midshore	$19.8 \leq l < 30.5$	$50 \leq w < 150$
offshore	$l \geq 30.5$	$w \geq 150$

In this report we maintain the traditional nomenclature. To simplify the presentation, unless otherwise specified, we include in the inshore sector both inshore and nearshore vessels (i.e., all vessels less than 19.8 m), while the offshore sector is defined to include midshore and offshore vessels (i.e., all vessels 19.8 m and over).

In terms of both quantity and value, landings by the inshore sector have been consistently greater than those of the offshore (see Figure 1-7). In 1983, the inshore sector accounted for about 60 percent of landings by quantity and 70 percent by value. That the value of inshore landings is relatively greater than quantity is explained mainly by the species available to the inshore sector -- high-valued species such as lobster and crab. It is also explained by differences in the methods used to price groundfish landings by the inshore and offshore sectors. Inshore prices are generally based on prevailing market prices (except in Newfoundland). Offshore prices, on the other hand, tend to be accounting prices set to meet the internal requirements of vertically integrated companies. They are prices in a nominal sense only and are lower than inshore prices. The significance of the difference between these prices is taken up later in the study.

Figure 1-7: Quantity and Value of Atlantic Coast Inshore and Offshore Landings,1983

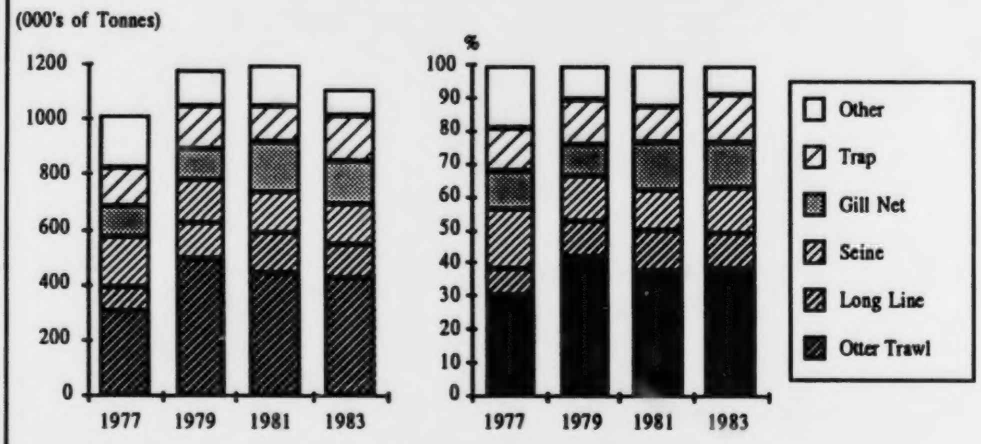


Source: D.F.O., "Annual Statistical Review", 1983.
Prepared by Gardner Pinfold Consulting Economists Ltd.

A variety of gear types and fishing methods is used. The type of gear used depends on several factors but mainly on the characteristics of the species the fisherman is licensed to fish, vessel size, and the preferences of the fisherman. The inshore sector uses both fixed gear (i.e., traps, weirs, gill nets, handline and longline) and mobile gear (i.e., trawl and dredge), while the offshore sector relies mainly on mobile gear (i.e., trawl, dredge and seine). Traps, handlines and longlines are commonly used for groundfish by fishermen operating inshore vessels. Among nearshore and midshore vessels, the otter trawl is the most common gear for groundfish followed by longline. With one or two exceptions, offshore groundfish vessels use the otter trawl. For pelagic species, the purse seine is the predominant gear used followed by gill nets. The gear for shellfish is highly species-specific: traps for lobster and crab, dredge for scallops and trawl for shrimp.

Since 1977, there have been only slight changes in the relative importance of the various gear types in terms of quantity of fish caught. The otter trawl is the predominant gear type, in recent years accounting for 35-40 percent of total landings. The landings of each of the other main gear types fluctuate within the 10-20 percent range. Atlantic coast landings by gear type, 1977-1983, are depicted in Figure 1-8.

Figure 1-8: Nominal Catch by Gear Type, All Species, 1977-1983



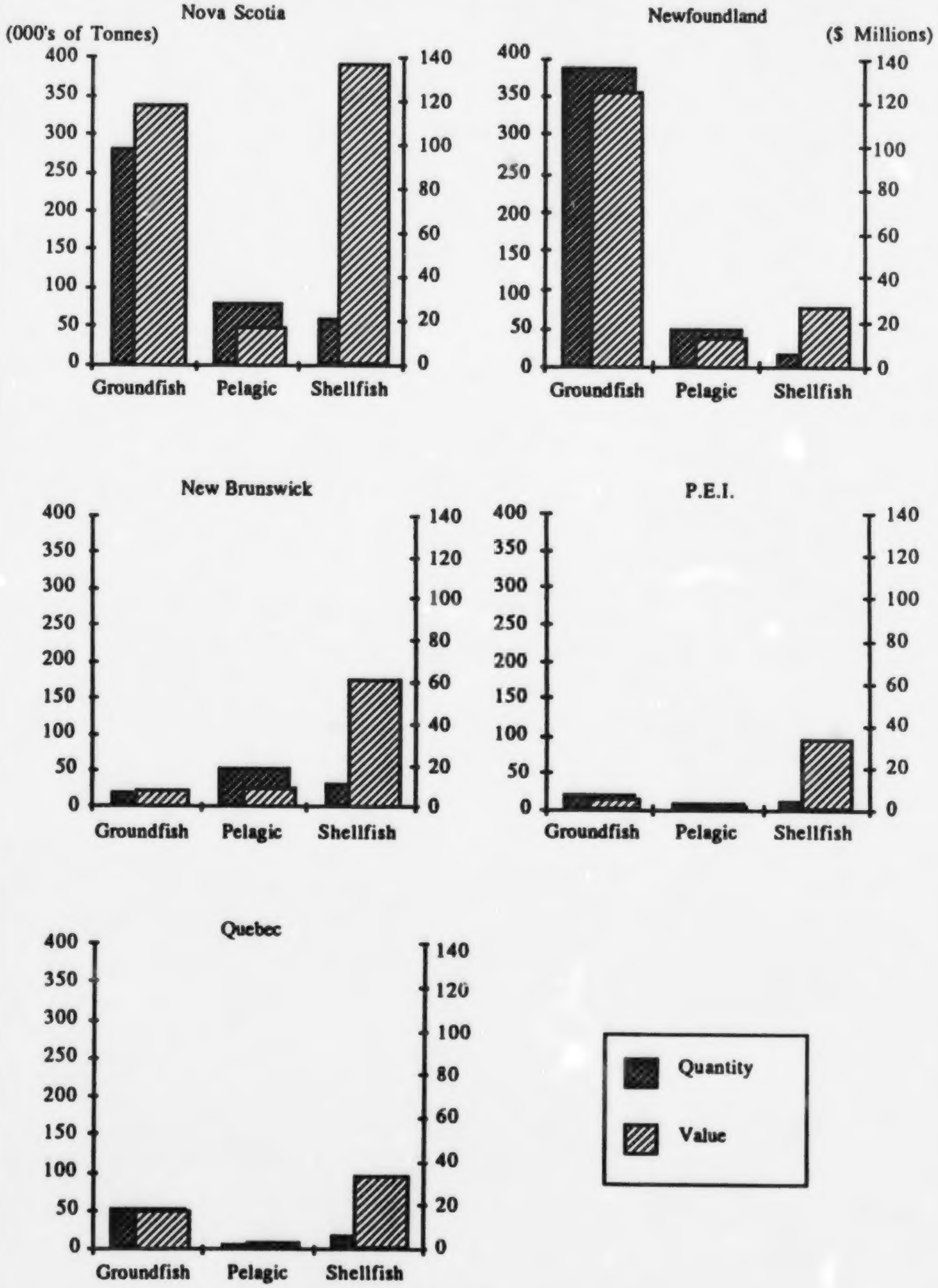
Source: DFO, "Annual Statistical Review", 1977, 1979, 1981, 1983.
Prepared by Gardner Pinfold Consulting Economists Ltd.

Landings by Province

The quantity and value of landings by province vary considerably. Nova Scotia and Newfoundland are the main fishing provinces; in recent years their combined landings have accounted for about 80 percent of the quantity and 75 percent of the value of landings in Atlantic Canada. By virtue of its proximity to the rich cod fishery on the Grand Bank, Newfoundland generally leads all provinces in quantity landed. Nova Scotia follows close behind in quantity and generally leads in the value of landings due mainly to the availability of such high-valued species as lobster and scallop. The industries in both provinces are characterized by seasonal and year-round fisheries.

Landings by New Brunswick, Prince Edward Island and Quebec are substantially lower. Fishermen in these provinces operate mainly in the Gulf of St. Lawrence, though New Brunswick fishermen also operate in the Bay of Fundy. The Gulf fishery is highly seasonal (six to eight months) and is prosecuted primarily by inshore vessels. Cod is the main species by quantity, while crab and lobster lead in terms of value. Provincial landings by quantity, value and species group for 1983 are depicted in Figure 1-9.

Figure 1-9: Nominal Catch and Value by Species Group and Province, 1983



Source: DFO, "Annual Statistical Review", 1983
Prepared by Gardner Pinfold Consulting Economists Ltd

The Processing Sector

Fish is landed in approximately 1,650 communities in Atlantic Canada. The large and operationally diverse processing sector is composed of just over 650 fish plants in about 425 port communities scattered throughout the region (Figure 1-10). The greatest concentration of ports and fish plants is in southwest Nova Scotia.

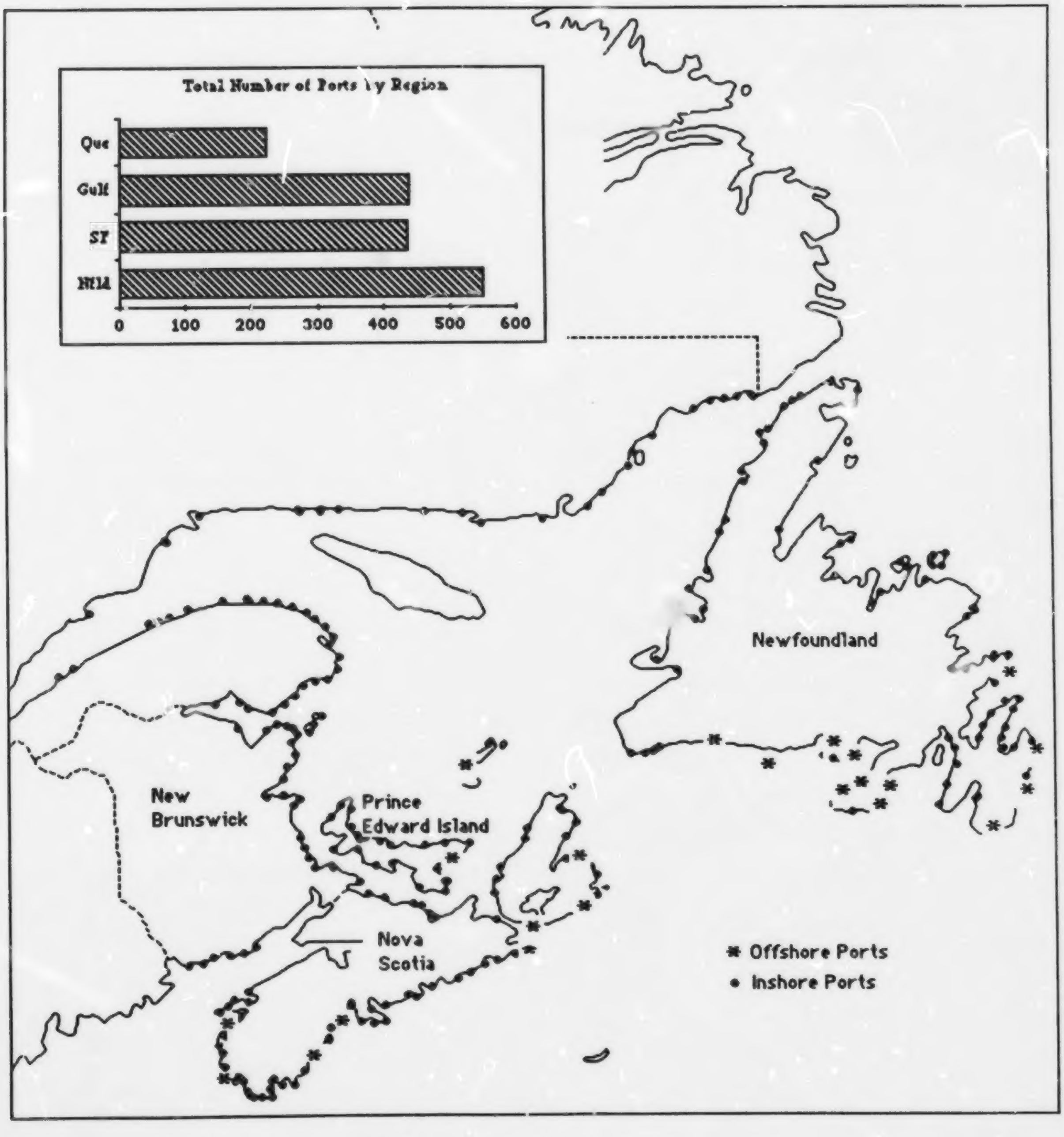
Plants (and ports) may be divided into two general categories: those oriented towards the inshore fishery and those with an offshore orientation. With their smaller-scale shore facilities and processing operations, inshore plants are supplied by inshore vessels and tend to operate on the seasonal basis dictated by their source of raw material supply. Plants are relatively labour intensive, producing mainly fresh whole and filleted fish, and salted and dried products. Employment may range from fewer than ten to as many as two hundred people. Most operate for six to eight months only, while some, notably ones in southwest Nova Scotia, operate year-round. All but a few plants fall into the inshore category.

Offshore plants have substantial shore facilities and processing capacity, and many are highly mechanized. There are twenty-five offshore plants; Newfoundland and Nova Scotia each have eleven, with the others in Quebec and Prince Edward Island. All but five plants process groundfish and are supplied mainly or exclusively by offshore trawlers. The five exceptions process mainly shellfish and/or pelagic species and are located in southwest Nova Scotia. These plants operate offshore scallop draggers, lobster vessels or herring seiners, and rely on inshore fishermen for their supply of groundfish. Offshore plants produce mainly frozen fillets and blocks, but depending on location and species supplied may also produce fresh whole and filleted fish. Some of the larger plants have secondary processing facilities for the manufacture of cooked and breaded products.

Products and Markets

Groundfish products lead those produced from shellfish and pelagic species in terms of both weight and value. In 1984, groundfish products accounted for about 70 percent of total production by weight, followed by pelagic and shellfish products at 20 and 10 percent, respectively. The dominance of groundfish is far less pronounced in terms of value, as groundfish products accounted for about 50 percent of production compared with

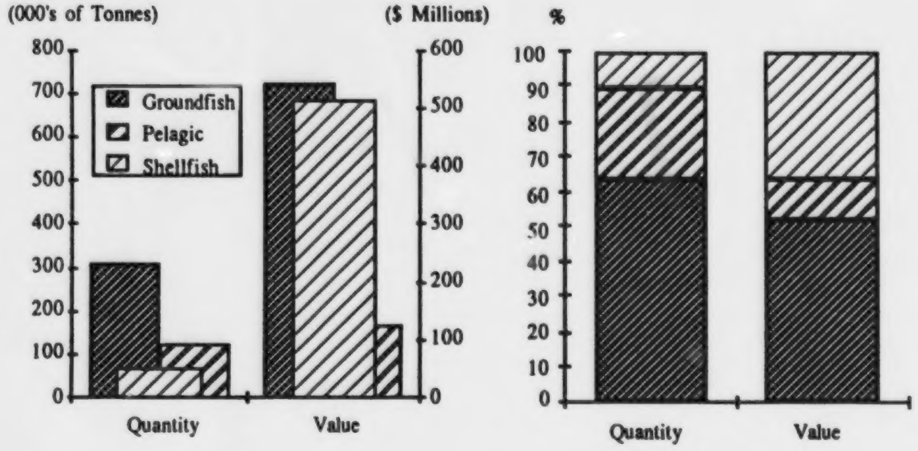
Figure 1-10: Offshore and Inshore Ports in Atlantic Canada


Total Number of Ports by Region
Que
Gulf
SF
Nfld
0
100
200
300
400
500
600
Newfoundland
New Brunswick
Prince Edward Island
Nova Scotia
* Offshore Ports
• Inshore Ports

Prepared by: Gardner Pinfold Consulting Economists Limited.

about 35 percent for shellfish. The quantity and value of Atlantic coast production by species group are shown in Figure 1-11.

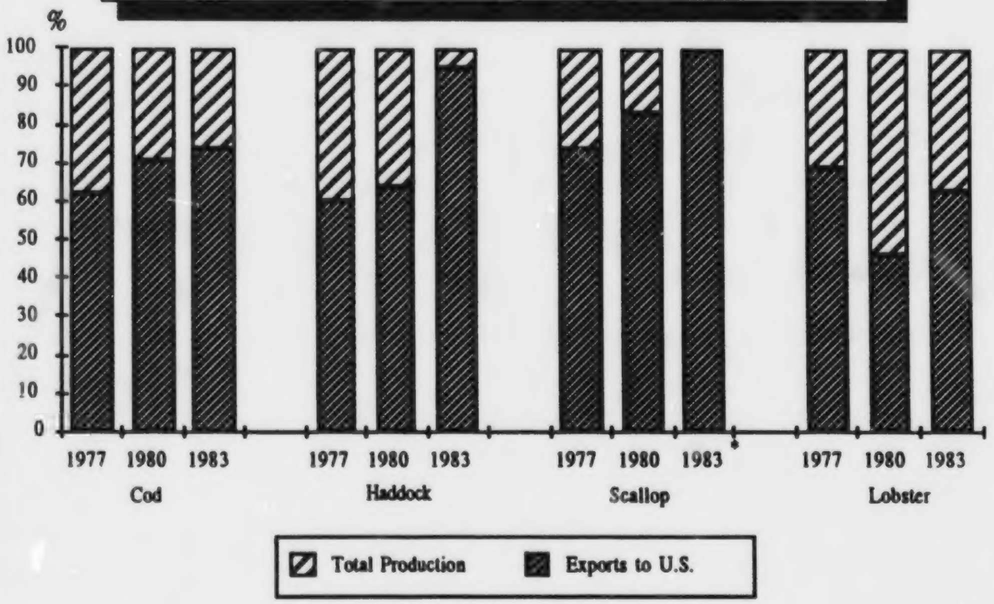
Figure 1-11: Quantity and Value of Atlantic Coast Production by Species Group



Source: DFO, "Annual Statistical Review", 1983.
Prepared by Gardner Pinfold Consulting Economists Ltd.

Approximately 85 percent of fish production in the Atlantic region is exported from Canada. The United States is the principle market, followed by the European Economic Community and Japan. In 1984, the United States was the destination for about 70 percent of Atlantic Canada's production by quantity and value. For certain groundfish and shellfish species, exports to the United States exceed 80 percent of production. The dominance of the United States market for fresh and frozen cod, haddock, lobster and scallop products is depicted in Figure 1-12.

Figure 1-12: Exports to the United States as a Percent of the Total Quantity of Atlantic Coast Production, Selected Species and Years



* Note: Due to inventory adjustment scallop exports to U.S. in 1983 exceeded total production.

Source: DFO, "Annual Statistical Review", 1977, 1980, 1983.
Prepared by Gardner Pinfold Consulting Economists Ltd

CHAPTER TWO
INDUSTRY STRUCTURE

1. Introduction

Industry structure plays a major role in the formation of fish prices in port markets. By industry structure is meant those characteristics of an industry governing the nature of competition among buyers and sellers. The characteristics of an industry generally used to define its structure are:

- the number and relative size of participants (buyers and sellers) in the industry;
- the nature of the relationships among participants, including vertical integration and informal ties between buyers and sellers;
- the relative position of existing participants and potential entrants in terms of entry and exit conditions.

Industry Concentration: The number and relative size of buyers and sellers provide an indication of market power and reflect the degree of competitiveness in an industry. Market power is normally expressed in terms of industry concentration: the share of sales or purchases accounted for by the largest firms. In markets characterized by high concentration, (where a few firms account for a substantial proportion of purchases or sales), firms have the potential to exert considerable influence over price. In markets characterized by low concentration, (where no firm accounts for a relatively large share of purchases or sales), all firms are price takers. The extreme cases of market power are monopoly and monopsony where a single seller or buyer dominates the market, and perfect competition where there are a large number of buyers and sellers none of whom is sufficiently large to influence the market. Such cases rarely, if ever, occur in practice. The more common market structure in Canada is oligopoly or oligopsony where concentration is relatively high and the larger firms are able to exert at least some influence over price.

Buyer-Seller Relationships: Vertical integration and other ties may inhibit the independence of buyers and sellers. To the extent independent action is constrained by formal or informal ties, transactions between two firms may not be subject to competition by other firms.

Entry and Exit Conditions: Freedom of entry and exit are fundamental characteristics of a perfectly competitive industry. This means any new firm may commence production if it so wishes, and any firm may cease production and leave the industry if it so wishes. Existing firms cannot bar the entry of new ones and there are no legal prohibitions to entry or exit. Where barriers to entry exist, industry behavior (price or investment behaviour) would depart from that predicted by the competitive model. The greater the barriers to entry the more closely the industry would approximate a monopolistic structure. The most common barriers to entry are:

- economies of scale relative to the size of the market
- product differentiation (brand or selling) advantages
- absolute cost advantages
- government regulation

Industry exit conditions depend mainly on the mobility and opportunity cost of capital and labour.

The structural characteristics of the Atlantic coast fishing industry are examined in this chapter. Since the main objective of the study is to explain price behaviour in port markets, the focus of the analysis is the industry structure at this level. But the demand for raw fish is a derived demand; it derives from the demand for processed and semi-processed fish in wholesale and retail markets. At each level the industry is characterized by a different market structure.

2. Port Markets

In 1984, DFO recorded fish landings and sales transactions at 1,656 locations (we refer to landing sites hereafter as ports) in Atlantic Canada. The number of inshore and offshore ports by region is set out in Table 2-1. Included in the latter category are the home ports of the offshore trawler and scallop dragger fleets.

The importance of ports in terms of quantity of landings varies widely. Many of the region's inshore ports have landings of just a few tonnes, while landings in the offshore ports generally exceed several thousand tonnes.[1] The frequency distribution in Figure 2-1 shows about 900 of the region's ports had landings less than 100 tonnes; by contrast, only 80 ports had landings in the 1,000 to 5,000 tonne range, and landings in just 30 ports exceeded 5,000 tonnes.

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[1] Groundfish is not landed at all ports in Atlantic Canada. The extreme example is the Scotia-Fundy Region, where in 1984, there were no groundfish landings in 246 of the 438 ports.

Table 2-1
Number of Inshore and Offshore Ports by Region, 1984

Region	Inshore	Offshore	Total
Newfoundland	542	11	553
Scotia-Fundy	426	11	437
Gulf	439	2	441
Quebec	224	1	225
Total	1631	25	1656

Source: DFO, unpublished landings data.

Having a sense of relative port size at the regional level will be useful background to the analysis of market structure. Since the main focus of this study is price formation in relation to groundfish, relative port size is examined in terms of landings of this species group.

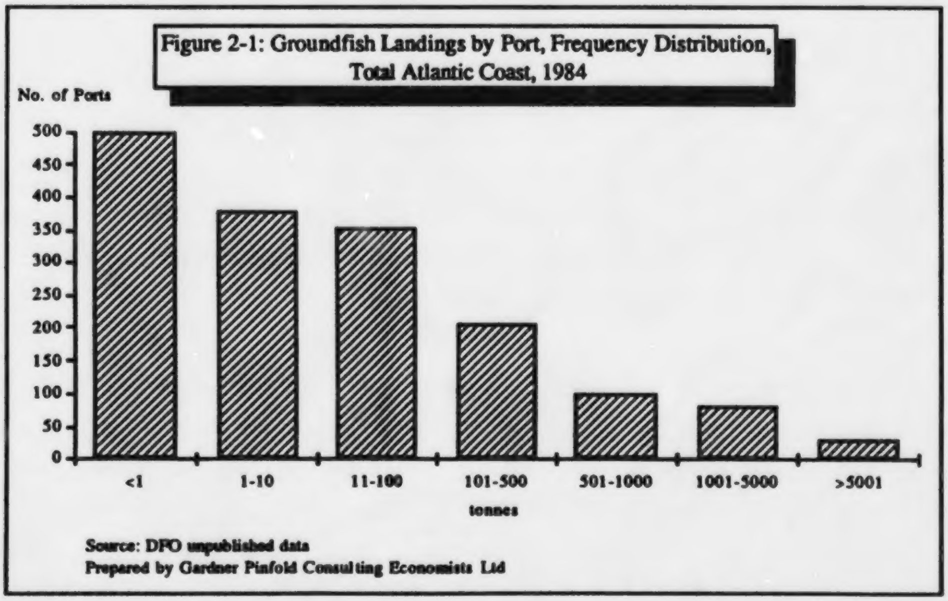


Figure 2-1: Groundfish Landings by Port, Frequency Distribution, Total Atlantic Coast, 1984

Source: DFO unpublished data
Prepared by Gardner Pinfold Consulting Economists Ltd

The relative concentration of groundfish landings among ports in each region is measured using conventional Lorenz Curve analysis (Figure 2-2). The Lorenz Curve depicts concentration by plotting the relationship between the cumulative percentage of landings and the cumulative percentage of ports. A 45° line drawn from the origin serves as the benchmark for the analysis. If landings by port were equal, the Lorenz curve would coincide with the diagonal. The extent to which the curve deviates from the diagonal measures the degree of concentration.

The Lorenz Curve analysis shows a relatively high concentration of groundfish landings among ports in each region, though with significant regional differences. Figure 2-2 shows landings concentration is greatest in Newfoundland, where in 1984, five percent of ports accounted for 71 percent of landings. Quebec ranked second, with five percent of ports accounting for 68 percent of landings. The Gulf and Scotia-Fundy regions ranked third and fourth, with five percent of ports accounting for 64 and 59 percent of landings, respectively. It is interesting to note that only among the top five percent of ports is there any significant difference in the concentration of landings among the regions.

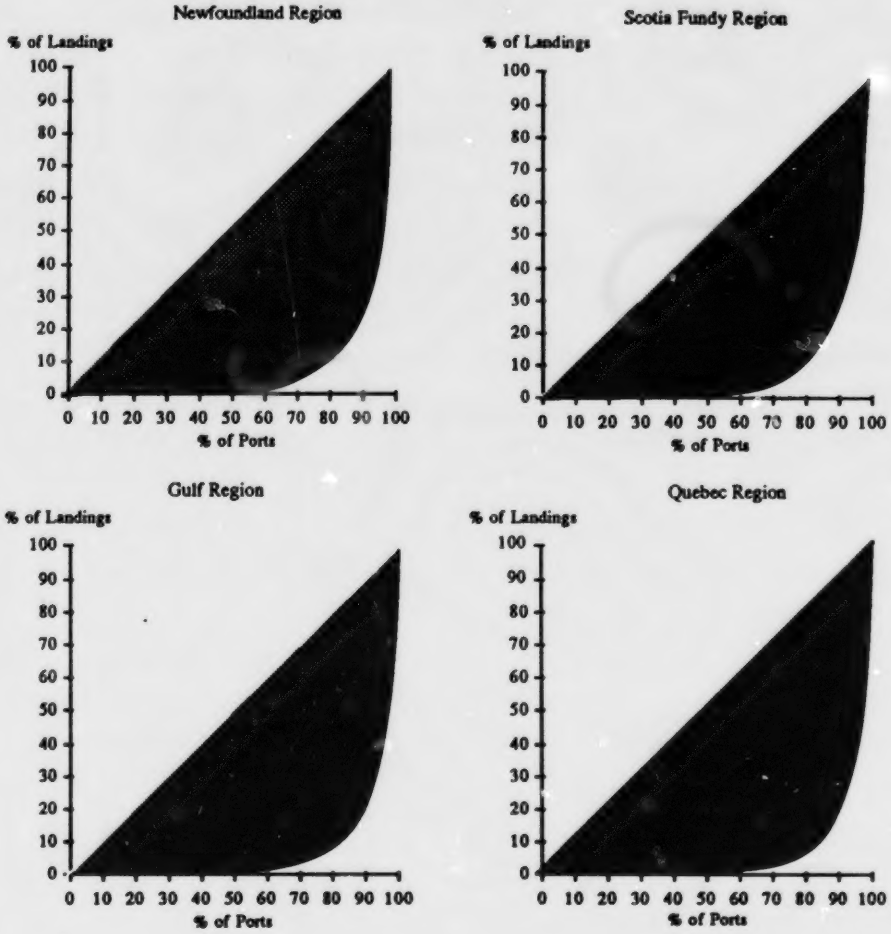
One of our objectives in this study is to examine price formation by assessing the structure and performance of the industry in a representative set of port markets in Atlantic Canada. The factors considered when selecting ports for detailed analysis were:

- port size in terms of quantity and value of landings
- port location and relative isolation
- number of buyers and sellers
- species mix
- product mix
- type of fishery (inshore/offshore)

A substantial data base was compiled for each port selected. Among these data are weekly landings and prices for various species, number of buyers by port and the quantity of purchases by buyer, the number of sellers (fishermen) by port and the number of different buyers each seller had transactions with from month to month. The data were provided by DFO's statistical branches in each of the regions.

To ensure a substantial coverage of the total quantity and value of landings in Atlantic Canada, data were collected for some 100 ports. These ports are identified on the

Figure 2-2: Concentration of Groundfish Landings Among Ports by Region, 1984
(quantity)



	Groundfish Landings *			
Ports	Newfoundland	Scotia Fundy	Gulf	Quebec
5 %	71%	59%	64%	68%
10%	80%	76%	80%	80%
25%	95%	94%	94%	97%
50%	99%	99%	98%	99%

* Note: The Figure indicates landings are concentrated in a few large ports. In Newfoundland, for example, 5 percent of the ports account for 71 percent of the total groundfish landings.

Source: DFO, unpublished data.
Prepared by: Gardner Pinfold Consulting Economists Ltd.

maps in Figures 2-3, 2-4 and 2-5. For convenience, we refer to them hereafter as the "study ports". The number of ports by region is as follows:

• Newfoundland	32
• Scotia-Fundy	25
• Gulf	27
• Quebec	16

The ports selected include many of the largest in the regions as well as some of the smallest. In 1984 they accounted for just over 60 percent of the total landings (all species) and about 70 percent of groundfish landings in Atlantic Canada. The proportion of landings accounted for by the study ports in each region is summarized in Table 2-2.

Table 2-2
Landings by Region and Study Ports - 1984 (tonnes)

Region	All Species			Groundfish		
	Total	Study Ports	%	Total	Study Ports	%
Newfoundland	357,593	235,397	66	308,758	212,676	69
Scotia-Fundy	415,715	252,004	61	256,306	180,089	70
Gulf	227,000	128,323	57	120,247	88,863	74
Quebec	83,594	55,229	66	56,173	42,742	76
Total	1,083,902	670,953	62	741,484	524,370	71

Source: DFO, unpublished landings data.

Port market structures in Atlantic Canada vary, but may be described generally as either oligopsonistic or monopolistic (bilateral). Inshore ports in the Maritimes and Quebec fall into the oligopsonistic category, with a high degree of buyer concentration and a large number of independent fishermen-sellers.[2] The market structure in virtually all Newfoundland ports (inshore and offshore) and a few in the Maritimes and Quebec more closely approximates a bilateral monopoly, with minimum prices established through collective bargaining between processors and fishermen's unions. Though the port markets generally fall into one of these two categories, within each there are significant differences in terms of buyer concentration, entry conditions (particularly in the case of

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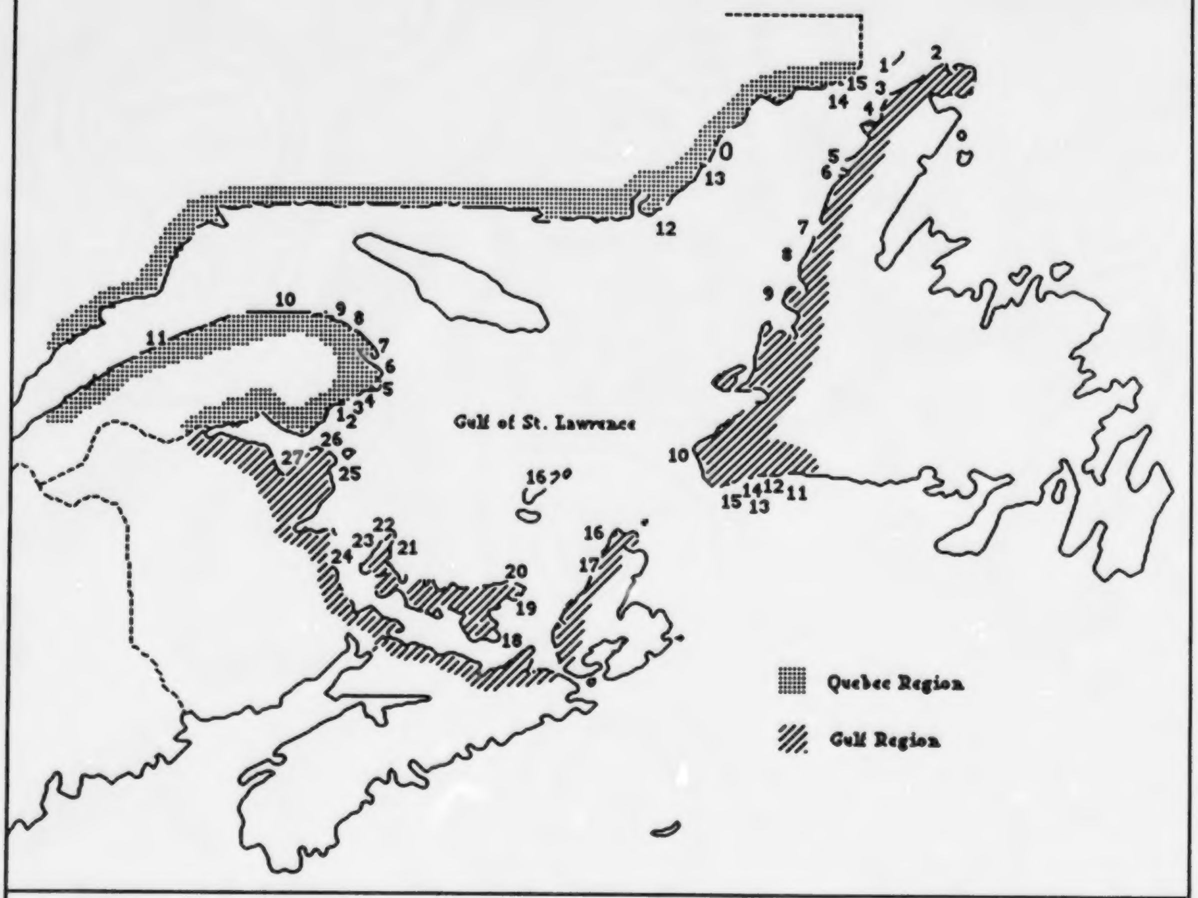
[2] Strictly speaking, it is the fishing enterprise comprised of the vessel owner and crew that is the seller. We use "fisherman" to denote the seller because readers will be more familiar with this term.

Figure 2-3: Location of Study Ports in the Gulf and Quebec Regions


Gulf of St. Lawrence
Quebec Region
Gulf Region
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Study Ports:

Gulf Ports

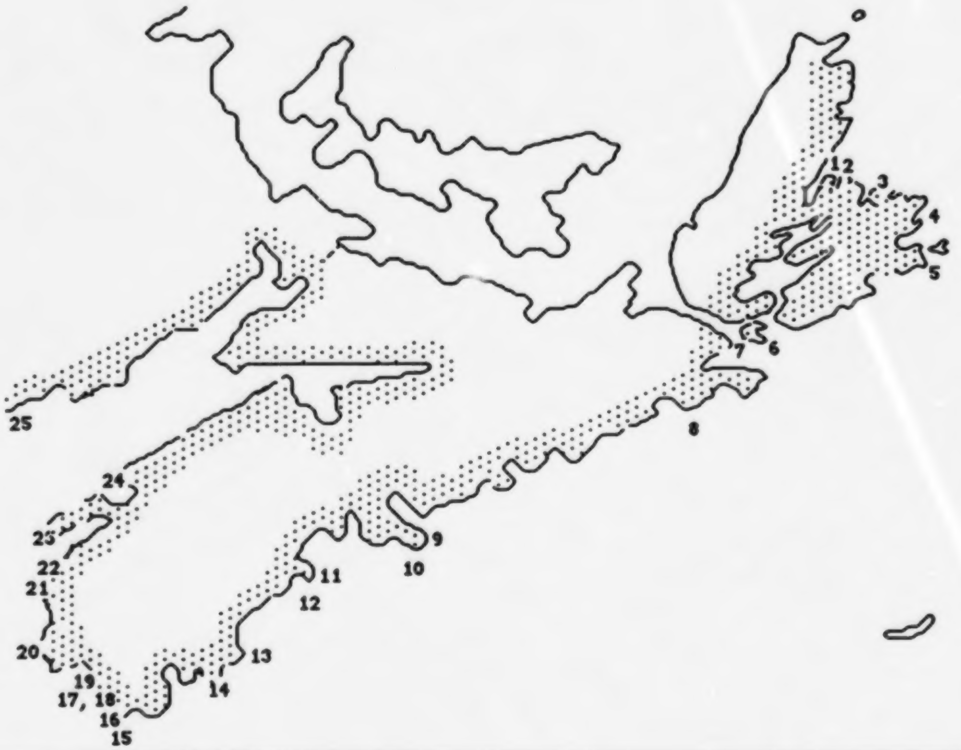
1. L'Anse au Loup (Lab.)
2. Cook's Harbour
3. Anchor Point
4. Black Duck Cove
5. Port au Choix
6. Port Saunders
7. Parson's Pond
8. Cow Head
9. Trout River
10. Codroy
11. Rose Blanche
12. Burnt Island
13. Isle aux Morts
14. Margaree
15. Port-aux-Basques
16. Pleasant Bay
17. Cheticamp
18. Beach Point
19. Souris
20. North Lake
21. Tignish Run
22. Skinner's Pond
23. Howard's Cove
24. Point Sapin
25. Shippegan
26. Lameque
27. Caraquet

Quebec Ports

1. Paspebiac
2. Gascons-Ouest
3. Ruisseau-Chapados
4. Newport (Pointe de)
5. Grande Rivière
6. Sainte-Thérèse
7. Anse à Beaufils
8. Rivière au Renard
9. Cloridorme
10. Sainte Anne des Monts
11. Matane
12. Natashquan
13. Harrington Harbour
14. Rivière Saint-Paul
15. Blanc Sablon
16. Cap-aux-Meules

Prepared by Gardner Pinfold Consulting Economists Limited.

Figure 2-4: Location of Study Ports in the Scotia-Fundy Region

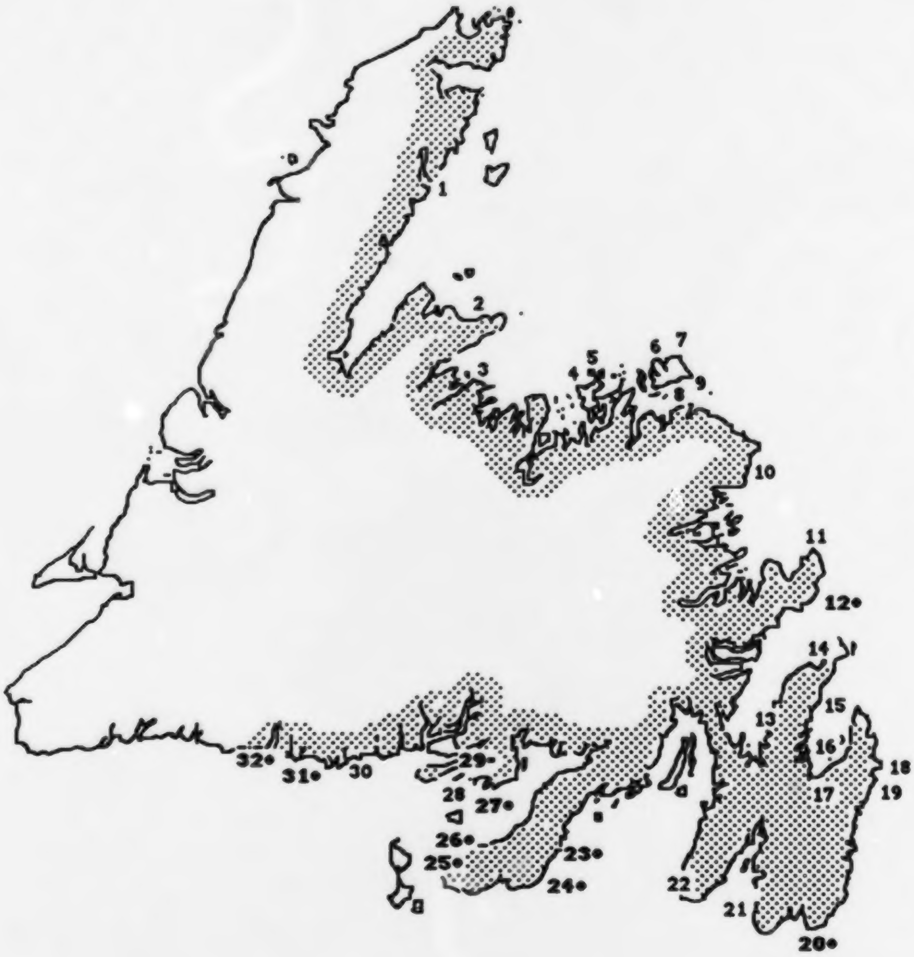


Study Ports:

1. Alder Point
2. North Sydney
3. Glace Bay
4. Port Morien
5. Louisbourg
6. Petit de Grat
7. Canso
8. Port Bickerton
9. Eastern Passage
10. Sambro
11. Lunenburg
12. Riverport
13. Central Port Mouton
14. Shelburne
15. South Side
16. Clarks Harbour
17. West Head
18. Lower West Pubnico
19. Woods Harbour
20. Yarmouth
21. Meteghan
22. Saulnierville
23. Westport
24. Digby
25. Wilson's Beach

Prepared by Gardner Pinfold Consulting Economists Limited.

Figure 2-5: Location of Study Ports in Newfoundland Region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Study Ports:

1. Englee
2. La Scie
3. Triton
4. Twillingate
5. Herring Neck
6. Fogo
7. Joe Batt's Arm
8. Seldom
9. Musgrave Harbour
10. Valleyfield
11. Bonavista
12. Catalina
13. New Harbour
14. Old Perlican
15. Harbour Grace
16. Port de Grave
17. Holyrood
18. St. John's
19. Petty Harbour
20. Trepassey
21. Admirals Beach
22. St. Brides
23. Marystown
24. Burin
25. Fortune
26. Grand Bank
27. Harbour Breton
28. Hermitage
29. Gaultois
30. Francois
31. Ramea
32. Burgeo

• denotes a trawler port

Prepared by Gardner Pinfold Consulting Economists Limited.

processors), and the nature and strength of the formal and informal ties between fishermen and processors.

The structural characteristics of the industry generally and of port markets in particular are described below.

Concentration

Buyers

Virtually all fish caught on the Atlantic coast is bought directly or indirectly by local processors. There are an estimated 350 processing companies in the region operating some 670 plants.[3] The number of plants by region is given in Table 2-3.[4]

Table 2-3
Atlantic Canada Processing Plants by Species and Region

Region	Total Plants	Species Processed				Total Operations
		Groundfish	Pelagic	Shellfish	Other	
Newfoundland	124	97	77	28	13	215
Scotia-Fundy	240	182	64	59	26	331
Gulf	181	103	117	100	13	333
Quebec	51	33	21	33	1	88
Total	596	415	279	220	53	967

Note: Number of operations exceeds plants because many plants process several species.

Source: DFO, "Atlantic Shore Processing Capacity Study", 1983.

The processing companies fall into one of four main categories:[5]

- Large multi-plant firms including National Sea Products and Fishery Products International. These firms are vertically integrated with substantial interests in offshore vessels (mainly trawlers). To supply certain plants, they buy a substantial proportion of their fish from inshore fishermen.

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[3] Many ports have more than one plant, suggesting that in the range of two-thirds of the 1,656 ports on the Atlantic coast serve simply as buying stations.

[4] The data in Table 2-3 are based on a survey of 670 of the 700 registered plants in Atlantic Canada. The 596 plants for which data are available are ones actually operational in 1983.

[5] For a more detailed discussion see Charles Steinberg, *Structure and Price Determination in Maritime Port Markets: A Study of Fishermen/Buyer Relations*, 1984.

- Small multi-plant firms, most of which are vertically integrated, some with substantial interests in offshore vessels (mainly scallop draggers and herring seiners, but some trawlers). Most of these firms rely heavily on inshore fishermen for their groundfish.
- Independent single-plant firms, some of which operate vessels, but for the most part purchase fish from inshore fishermen.
- Small independent single-plant firms which buy all their fish from inshore fishermen.

Using 1985 data *for the study ports* it is clear buyer concentration at the industry level is high. At the regional level concentration among buyers of groundfish is highest in Newfoundland where the four largest firms account for about 90 percent of purchases; it is lowest in Quebec where the four largest firms account for 55 percent of purchases. In contrast, concentration among lobster buyers is significantly lower in all regions but Quebec where the four largest firms account for 81 percent of purchases. Concentration appears to be lowest in Scotia-Fundy where the four largest buyers account for 31 percent of purchases. Concentration ratios by region are presented in Table 2-4.[6]

Table 2-4
Buyer Concentration on Purchases by all Buyers
for Study Ports - 1985 (tonnes)

	Groundfish			Lobster		
Region	Total Purchases	Purchases of Top 4 Buyers	% of Total	Total Purchases	Purchases of Top 4 Buyers	% of Total
Newfoundland	217824	196042	90	187	96	51
Scotia-Fundy	188605	118821	63	4167	1292	31
Gulf(1)	76487	42863	56	2880	1134	39
Quebec	42659	23630	55	315	255	81

Note: (1) Excludes Shippegan.

Source: DFO, Port Buyer Data.

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[6] Buyer data were provided by each region. For reasons of confidentiality buyers were identified by code number, not name. Since code numbers varied from region to region, it was not possible to estimate buyer concentration for Atlantic Canada as a whole.

In assessing buyer concentration it is important to draw a distinction between purchases made from inshore fishermen and "purchases" made from the companies' own vessels. Vertical integration has important implications for industry structure and price formation (these points are taken up later in this report). The data in Table 2-4 represent all purchases irrespective of source of supply. A different picture of buyer concentration emerges in Newfoundland and Scotia-Fundy when a distinction is drawn between inshore and offshore purchases. Given the size of the offshore groundfish fishery (in terms of quantity of landings) and the limited number of vertically integrated firms involved, buyer concentration is significantly higher than among purchasers of fish caught by inshore fishermen. The regional differences in buyer concentration levels for inshore- and offshore-caught groundfish are shown in Table 2-5.

Table 2-5
Buyer Concentration for Inshore and Offshore Groundfish
Landings in Study Ports - 1985 (tonnes)

Region	Inshore			Offshore		
	Total Purchases	Purchases of Top 4 Buyers	% of Total	Total Purchases	Purchases of Top 4 Buyers	% of Total
Newfoundland	39,076	18,366	47	179,523	179,523	100
Scotia-Fundy	78,896	19,724	25	110,879	107,553	97
Gulf	60,292	37,033	61	16195	13,090	81
Quebec	32,052	16,399	51	10,608	10,236	96

Source: DFO, unpublished landings data.

Before proceeding, two caveats about the information in Table 2-4 are in order.

- First, the data used to compile the concentration ratios are for the study ports only, not all ports in the region. Industry-wide concentration may be higher or lower, depending of course on the relative importance of the top four firms in other ports in the region. For groundfish, any differences are likely to be slight since the study ports account for a substantial proportion of landings in each region (see Table 2-2).

- Second, the transactions data forming the basis of the estimates of buyer concentration do not capture secondary sales. In many cases purchases are made by several processors on behalf of a single wholesaler (a prevalent practice with lobster), or by processors who do minimal processing before reselling to a larger processor (e.g., in the case of feeder plants). In these cases it is the secondary, not the primary, buyer

> who exerts the market influence. As a result, there is a downward bias in buyer concentration estimates, particularly for lobster.

Buyer concentration at the port market level is high throughout Atlantic Canada. The extreme examples are the trawler ports, where a single buyer (the vessel owner) generally accounts for over 90 percent of purchases. Inshore landings in the trawler ports tend to be low and may or may not be purchased by the integrated company. Most inshore ports have more than one buyer, but a single buyer (the local processor) usually accounts for at least 30 percent of the purchases.

In the following sections we examine buyer concentration by port on a region by region basis. In general, concentration is highest in Newfoundland where in most ports (inshore and offshore) a single buyer accounts for over 90 percent of purchases. Concentration is lowest in Scotia-Fundy, where in several inshore ports the largest buyer accounts for 30 to 40 percent of purchases.

Newfoundland Region

The Newfoundland study ports, both inshore and offshore, are characterized by high concentration among buyers of groundfish and lobster. For groundfish, a single buyer accounts for at least 90 percent of purchases in all but 7 ports (inshore). These ports have between 2 and 4 buyers. The dominant buyer is generally the owner of the local fish plant. Where the number of buyers is 5 or more, a single buyer can account for as little as 40 percent. These ports usually have more than one plant. Concentration in all offshore ports exceeds 95 percent. This is the case even in those ports with several buyers. The dominant buyer is the vertically integrated processing company.

Buyer concentration in the Newfoundland study ports is summarized in Table 2-6. For each study port, Table 2-6 gives inshore and offshore groundfish landings, the maximum number of buyers in the port at any time during the year, and the proportion of landings accounted for by each of the top three buyers. Corresponding information for lobster is given in Table 2-7.

Scotia-Fundy Region

In the Scotia-Fundy Region buyer concentration varies widely, depending mainly on the inshore or offshore character of the port. Concentration is generally lower for both

Table 2-6
Buyer Concentration of Groundfish, Newfoundland Region, 1985(1)

Port	Landings (Tonnes)		# of Different Buyers(2)	Percent of Landings Accounted by Buyer:		
	Inshore	Offshore		A	B	C
Inshore Ports						
Admiral's Beach	1,604	0	5	40.1	34.1	24.6
St. Bride's	2,234	0	8	41.4	22.3	17.4
Old Perlican	2,971	0	8	56.0	39.2	2.2
Petty Harbour	2,411	0	6	58.3	20.5	13.6
Port de Grave	437	0	4	75.1	18.5	0.6
Fogo	975	0	3	76.3	19.4	4.3
New Harbour	91	0	3	83.5	13.2	3.3
Seldom	1,463	0	2	91.7	8.3	-
Englee	733	0	4	93.5	5.1	1.1
Joe Batt's Arm	1,916	0	2	93.6	6.4	-
La Scie	980	244	5	94.3	2.6	1.7
Hermitage	1,192	0	3	95.5	4.4	0.1
Burin	468	0	4	95.7	2.4	1.3
Harbour Grace	172	1,213	3	96.3	3.2	1.5
Francois	498	0	3	96.4	2.2	1.4
Triton	427	645	3	97.6	2.3	0.1
Twillingate	2,248	0	3	98.6	1.1	0.3
Musgrave Harbour	2,729	0	2	98.8	1.2	-
Valleyfield	1,851	0	2	99.4	0.6	-
Herring Neck	1,458	0	2	99.5	0.5	-
Bonavista	3,066	0	2	99.9	0.1	-
Holyrood	6	0	1	100.0	-	-
Offshore Ports						
Burgeo	1,268	17,372	4	93.2	3.6	3.0
Ramea	1,115	6,638	3	95.8	4.0	0.2
Trepassey	1,042	13,720	9	97.3	1.1	0.8
Gaultois	140	4,538	3	97.5	2.3	0.2
St. John's	1,778	25,304	8	97.9	1.1	0.2
Harbour Breton	2,396	11,743	8	98.0	1.2	0.5
Fortune	328	12,416	4	98.6	1.1	0.2
Marystown	45	35,097	3	99.2	0.8	0.0
Catalina	944	38,554	4	99.9	0.1	0.0
Grand Bank	96	11,949	2	99.9	0.1	-

Note: 1) Compiled from monthly data.
2) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

Table 2-7
Buyer Concentration of Lobster, Newfoundland Region, 1985(1)

Port	Inshore Landings (Tonnes)	# of Different Buyers(2)	Percent of Landings Accounted by Buyer:		
			A	B	C
Inshore Ports					
Admiral's Beach	1	1	100.0	-	-
St. Bride's	2	1	100.0	-	-
Old Perlican					
Petty Harbour					
Port de Grave					
Fogo	2	1	100.0	-	-
New Harbour					
Seldom	3	2	66.7	33.3	-
Englee					
Joe Batt's Arm					
La Scie					
Hermitage	5	2	80.0	20.0	-
Burin	6	2	83.3	16.7	-
Harbour Grace					
Francois					
Triton	63	3	52.4	28.6	19.0
Twillingate	12	5	33.3	33.3	16.7
Musgrave Harbour	47	3	61.7	34.0	4.3
Valleyfield					
Herring Neck	19	2	79.0	21.0	-
Bonavista					
Holyrood					
Offshore Ports					
Burgeo	2	1	100.0	-	-
Ramea	2	1	100.0	-	-
Trepassey					
Gaultois	2	1	100.0	-	-
St. John's					
Harbour Breton	15	2	93.3	6.7	-
Fortune	5	3	60.0	20.0	20.0
Marystown					
Catalina					
Grand Bank	3	2	66.7	33.3	-

Note: 1) Compiled from monthly data.
2) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

groundfish and lobster than in Newfoundland, especially in the inshore ports. For groundfish, the largest buyer in the offshore ports is the vertically integrated processing company who generally accounts for at least 90 percent of purchases.[7] In the inshore ports, the proportion of purchases accounted for by the largest buyer ranges from about 28 to 100 percent. Concentration is highest in relatively isolated ports (e.g., Port Morien, West Port). Concentration tends to be lowest in areas where there are a large number of ports in close proximity (e.g., in southwest Nova Scotia) and in ports where there are two or more fish plants. Buyer concentration among purchasers of groundfish is shown in Table 2-8.

Concentration is lowest in Sambro, Shelburne, Yarmouth and in the ports on Cape Sable Island. Each of these ports had at least 10 different buyers during 1985; Shelburne led with 38 buyers. The number of buyers tends to vary seasonally with the number of vessels. Whether a particular buyer appears in a port depends to a large extent on whether "his" vessels are fishing from that port. Shelburne is a good case in point. In addition to having a good wharf and unloading facilities, it has a good harbour offering excellent access to the fishing banks on the southern Scotian Shelf. Many fishermen who ordinarily operate from ports on the Bay of Fundy use Shelburne when weather or resource conditions make it advantageous to do so. To secure supplies and maintain the loyalty of the fishermen, the buyers to whom their catches are normally sold will ensure they are on hand to purchase this fish and truck it to their plants elsewhere in the province.

Buyer concentration in the case of lobster is marginally lower than for groundfish in the study ports, though in most ports there are fewer lobster buyers. In over half the ports the largest buyer accounted for less than 50 percent of purchases; in only four ports did the largest buyer account for more than 90 percent. The percentage of 1985 purchases accounted for by the top three buyers in each port is given in Table 2-9.

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[7] Louisbourg was an exception in 1985. Following a fire at the Highland Fisheries plant in Glace Bay, the company operated its vessels out of Louisbourg for most of the year. It continued to purchase the fish landed by its vessels, but the port of record for the transaction was Louisbourg not Glace Bay. Buyer concentration in Louisbourg was lower as a result (and lower than it would have been in Glace Bay as well). In 1984, the largest buyers in Louisbourg and Glace Bay accounted for 97 and 93 percent of purchases, respectively.

Table 2-8
Buyer Concentration of Groundfish, Scotia-Fundy Region, 1985(1)

Port	Landings (Tonnes)		# of Different Buyers(2)	Percent of Landings Accounted by Buyer:		
	Inshore	Offshore		A	B	C
Inshore Ports						
Shelburne	5,022	356	38	28.6	9.4	7.1
Yarmouth/Y. Bar	2,639	0	17	29.7	18.6	14.5
Sambro	4,581	1,020	13	31.3	28.2	21.7
Woods Harbour	5,528	0	15	32.1	23.6	18.7
Clarke's Harbour	2,812	59	13	32.2	30.3	13.6
West Head	5,860	0	17	35.1	24.8	19.7
Meteghan	5,202	0	9	35.4	34.7	26.9
Port Bickerton	1,033	699	9	40.3	21.2	19.9
Digby	3,923	0	11	42.9	22.7	12.5
Glace Bay	3,541	0	6	48.3	28.1	20.6
Lower West Pubnico	4,644	0	7	48.9	38.2	6.3
Eastern Passage	587	0	6	50.9	39.0	4.9
Wilson's Beach	509	0	5	63.5	26.1	4.7
South Side	3,320	0	5	75.4	24.5	0.0
Saulnierville	2,135	425	3	96.0	3.0	1.0
Port Morien	2,060	0	2	99.7	0.3	0.0
West Port	5,559	0	3	99.7	0.2	0.1
Offshore Ports						
Louisbourg	9,738	14,656	27	60.1	15.3	7.1
Riverport	414	1,965	9	82.6	16.6	0.3
Petit de Grat	1,348	12,167	4	90.0	9.3	0.6
Lunenburg	1,631	35,729	22	96.2	1.3	0.9
Alder Point	1,151	2,460	4	98.0	1.7	0.2
Canso	1,425	31,219	8	98.1	0.6	0.6
Central Port Mouton	1,336	1,887	4	98.8	1.0	0.2
North Sydney	1,670	9,137	4	99.6	0.2	0.1

Note: 1) Compiled from monthly data.
2) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

Table 2-9
Buyer Concentration of Lobster, Scotia-Fundy Region, 1985 (1)

Port	Inshore Landings (Tonnes) (2)	# of Different Buyers(3)	Percent of Landings Accounted by Buyer: A	B	C
Inshore Ports					
Shelburne	610	6	99.2	0.2	0.2
Yarmouth/Y. Bar	654	7	29.1	25.1	17.9
Sambro	61	5	39.3	32.8	13.1
Woods Harbour	767	16	30.4	22.7	18.1
Clarke's Harbour	476	7	50.2	30.7	13.4
West Head	262	9	34.0	22.9	20.6
Meteghan	161	4	39.1	24.2	22.4
Port Bickerton	12	2	75.0	25.0	-
Digby	15	3	60.0	20.0	20.0
Glace Bay	192	8	40.0	32.8	17.2
Lower West Pubnico	246	4	63.4	35.8	0.4
Eastern Passage	48	5	37.5	22.9	20.8
Wilson's Beach	4	2	75.0	25.0	-
South Side	73	2	68.5	31.5	-
Saulnierville					
Port Morien	140	3	97.9	1.4	0.7
West Port	139	4	93.5	4.3	1.4
Offshore Ports					
Louisbourg(*)	69	6	39.1	26.1	5.8
Riverport(*)	24	4	41.7	29.2	4.2
Petit de Grat(*)	32	3	50.0	12.5	3.1
Lunenburg(*)	67	4	40.3	23.9	14.9
Alder Point(*)	5	1	20.0	-	-
Canso(*)	32	4	71.9	6.3	3.1
Central Port Mouton	114	1	100.0	-	-
North Sydney(*)	19	1	15.8	-	-

Note: 1) Compiled from monthly data.

2) Including sales made directly by the fishermen to private buyers not registered with DFO. Where the sales account for a significant portion of total sales, i.e., they could account as one of the Top 3 buyers, an asterisk (*) has been put next to the port name.

3) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

Gulf Region

The Gulf Region study ports are divided almost equally between Newfoundland and the Maritime Provinces. On average, buyer concentration levels fall between those in the Newfoundland and the Scotia-Fundy Regions.

Within the Region, concentration tends to be higher in the Newfoundland ports than those in the Maritimes. The concentration level among Newfoundland ports generally exceeds 70 percent as it does with ports in the Newfoundland Region. This is due mainly to the ports' relative isolation. The exception is Port aux Basques where the number of buyers is highest (11) and buyer concentration (57 percent) among the lowest in the Gulf Region. Three factors would appear to account for this: the inshore fleet fishes year-round, landings are substantial, and the port is the terminus for the ferries linking Newfoundland with the mainland.

There is no particular pattern among Gulf ports in the Maritimes, with concentration levels ranging from about 26 to 99 percent. Cheticamp, one of the more isolated ports, has 11 buyers and a buyer concentration of just 30 percent. The port's size (1985 landings over 9,000 tonnes) undoubtedly acts as counterbalance to its relative isolation. Within Prince Edward Island, study ports on the Northumberland Strait have significantly lower buyer concentration levels than those on the Gulf of St. Lawrence. Plausible reasons for this are proximity to the ferry terminals linking the island to the mainland and over the side sales which are more common than in the latter ports. Concentration in Souris, the Region's only offshore port, is low compared with offshore ports in the other regions. This is due to the relatively greater importance of inshore landings and the number of independent buyers.

Concentration among buyers of lobster is generally lower than for groundfish, though the number of groundfish buyers is generally greater. The difference appears to be related to the significant proportion of lobster sales made directly by fishermen to unregistered buyers. Buyer concentration levels for groundfish and lobster are given in Tables 2-10 and 2-11.

Quebec Region

Buyer concentration levels in the Quebec Region range from 43 to 100 percent and are broadly similar to those in Newfoundland and the Gulf. They are generally higher than

Table 2-10
Buyer Concentration of Groundfish, Gulf Region, 1985(1)

Port	Landings (Tonnes)(2)		# of Different Buyers(3)	Percent of Landings Accounted by Buyer:		
	Inshore	Offshore		A	B	C
Inshore Ports						
Beach Point*	1037.1	0.0	3	26.7	2.9	0.0
Cheticamp*	9165.1	0.0	11	30.3	18.3	15.0
Caraquet*	1726.6	4709.0	8	39.0	34.2	14.7
North Lake	465.8	0.0	5	39.0	28.2	16.8
Port aux Basques*	9313.0	665.1	11	57.4	14.2	5.3
Trout River	1158.2	0.0	4	67.9	30.6	0.5
Cook's Harbour*	2752.9	59.3	7	69.6	15.5	6.2
Cow Head	867.9	0.0	4	69.8	15.2	7.4
Point Sapin*	297.6	0.0	3	75.4	22.2	0.0
Parson's Pond*	104.8	0.0	2	79.7	0.3	-
L'anse au Loup, Lab*	1343.9	7.0	2	80.8	17.7	-
Codroy	2369.0	0.0	7	81.6	16.1	1.3
Port aux Choix	6586.1	250.0	7	84.8	5.7	5.6
Anchor Point*	1675.5	0.0	5	89.9	9.0	0.2
Pleasant Bay*	962.1	0.0	4	92.7	3.5	2.4
Howard's Cove*	541.3	0.0	2	92.7	0.0	-
Rose BlancHe*	3189.0	721.8	5	93.2	6.0	0.2
Lameque	4153.3	1617.0	4	94.9	4.2	0.9
Burnt Islands	3292.4	0.0	4	95.9	3.2	0.4
Skinner's Pond*	301.6	0.0	2	96.9	0.5	-
Port Saunders	2493.7	22.8	4	97.1	1.1	0.8
Black Duck Cove	1979.1	260.2	6	98.4	1.1	0.2
Isle Aux Morts*	5538.1	171.2	6	98.7	0.6	0.4
Margaree* (Nfld)	3407.9	0.0	2	99.1	0.9	-
Tignish Run	1157.3	0.0	3	99.3	0.7	0.0
Trout River	0.1	0.0	1	100.0	-	-
Offshore Ports						
Souris	2114.6	7741.9	7	78.5	9.5	9.0

Note: 1) Compiled from monthly data.
2) Including sales made directly by the fishermen to private buyers not registered with DFO. Where the sales account for a significant portion of total sales, i.e., they could account as one of the Top 3 buyers, an asterisk (*) has been put next to the port name.
3) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, unpublished Landings Data.

Table 2-11
Buyer Concentration of Lobster, Gulf Region, 1985 (1)

Port	Inshore Landings (Tonnes) (2)	# of Different Buyers(3)	Percent of Landings Accounted by Buyer: A	B	C
Inshore Ports					
Beach Point	463.0	4	59.9	34.2	5.8
Cheticamp	105.6	7	37.6	32.2	11.9
Caraquet	102.2	5	34.6	25.0	23.7
North Lake	416.9	7	29.7	28.3	25.4
Port aux Basques*	3.1	1	87.1	-	-
Trout River*	42.1	1	98.3	-	-
Cook's Harbour*	1.1	1	72.7	-	-
Cow Head	32.1	4	48.0	24.9	15.9
Point Sapin	489.5	8	39.1	18.0	14.8
Parson's Pond*	39.5	2	68.3	28.1	-
L'anse au Loup, Lab	-	-	-	-	-
Codroy*	15.4	3	96.1	1.3	0.6
Port aux Choix*	105.1	2	50.5	48.6	-
Anchor Point	11.0	2	84.5	15.5	-
Pleasant Bay*	76.2	2	59.8	32.8	-
Howard's Cove*	288.9	3	89.3	7.9	0.1
Rose BlancHe*	14.2	3	96.5	0.7	0.7
Lameque	31.2	2	94.9	5.1	-
Burnt Islands*	25.8	1	98.8	-	-
Skinner's Pond*	260.4	2	87.4	7.4	-
Port Saunders*	51.8	2	61.8	36.7	-
Black Duck Cove	4.7	1	100.0	-	-
Isle Aux Morts*	0.2	0	-	-	-
Margaree* (Nfld)	0.3	0	-	-	-
Tignish Run	90.2	1	100.0	-	-
Offshore Ports					
Souris	168.2	2	67.3	32.7	-

Note: 1) Compiled from monthly data.
2) Including sales made directly by the fishermen to private buyers not registered with DFO. Where the sales account for a significant portion of total sales, i.e., they could account as one of the Top 3 buyers, an asterisk (*) has been put next to the port name.
3) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

those in the Scotia-Fundy Region. With the exception of Newport, there is a strong (inverse) relationship between the number of buyers and the level of concentration. Buyer concentration tends to be higher in the ports with only inshore vessels (Newport excepted).

Buyer concentration in the case of lobster is also relatively high. Again, this is explained by the limited number of buyers in each of the ports (one to three). Sales to unregistered buyers are not reported in the Quebec statistics. Buyer concentration levels for groundfish and lobster are given in Tables 2-12 and 2-13.

Sellers

There were 30,775 registered fishing vessels in the Atlantic fleet in 1983. About 30,400 of these are inshore or nearshore vessels (referred to here simply as inshore vessels); the other 375 are midshore or offshore vessels (referred to as offshore vessels). About half the vessels in the fleet are licensed to fish groundfish. Reliable statistics on the proportion of vessels actively participating in the various fisheries are not available. Estimates suggest no more than two-thirds would be active in most years.

The size and composition of the provincial fleets have been shaped by resource characteristics (e.g., species, abundance, seasonality, proximity) and climatic conditions, as well as a number of social, economic and political factors reflected in the policies governing vessel licensing. The Newfoundland and Nova Scotia fisheries are a mix of year-round and seasonal operations. Just over half the Atlantic fleet is based in Newfoundland with about 99 percent of the vessels falling in the inshore category. Nova Scotia accounts for about 20 percent of the Atlantic fleet and about 97 percent of its vessels fall in the inshore category. The fisheries of the other provinces are almost exclusively seasonal inshore operations with inshore vessels accounting for all but a handful of their combined fleet. The number of vessels in each fleet sector by province is given in Table 2-14.

Table 2-12
Buyer Concentration of Groundfish, Quebec Region, 1985(1)

Port	Landings (Tonnes)		# of Different Buyers(2)	Percent of Landings Accounted by Buyer:		
	Inshore	Offshore		A	B	C
Inshore Ports						
Rivière-au-Renard	9500.7	1127.6	14	43.2	17.4	12.0
Paspebiac	660.9	0.0	6	59.6	30.3	9.7
Matane	793.5	313.3	9	63.3	13.0	11.4
Grande-Rivière	5388.8	0.0	7	63.5	32.9	1.5
Ste Anne des Monts	618.0	46.1	6	64.0	24.1	6.2
Cloridorme	2383.4	430.3	4	65.6	33.1	1.1
Harrington	670.7	0.0	3	89.9	9.5	0.6
Ruisseau-Chapados	63.1	0.0	2	90.2	9.8	-
Blanc Sablon	853.7	0.0	4	95.1	3.8	1.1
Newport (Pointe de)	7035.2	0.0	8	98.3	0.8	0.3
Rivière Saint-Paul	495.3	0.0	2	99.5	0.5	-
Anse à Beaufils	719.6	0.0	1	100.0	-	-
Gascons-Ouest	19.9	0.0	1	100.0	-	-
Sainte-Thérèse	1431.9	0.0	1	100.0	-	-
Natashquan	1220.8	0.0	1	100.0	-	-
Offshore Ports						
Cap-aux-Meules	204.6	8690.3	6	97.4	1.7	0.4

Note: 1) Compiled from monthly data.
2) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

Table 2-13
Buyer Concentration of Lobster, Quebec Region, 1985(1)

Port	Inshore Landings (Tonnes)	# of Different Buyers(2)	Percent of Landings Accounted by Buyer:		
			A	B	C
Inshore Ports					
Rivière-au-Renard	23.3	2	55.8	44.2	-
Paspebiac	9.4	2	95.7	4.3	-
Matane					
Grande-Rivière	30.5	3	74.4	24.6	1.0
Ste Anne des Monts					
Cloridorme					
Harrington					
Ruisseau-Chapados	8.2	1	100.0	-	-
Blanc Sablon					
Newport (Pointe de)	3.6	2	61.1	38.9	-
Rivière Saint-Paul					
Anse à Beaufils	10.6	1	100.0	-	-
Gascons-Ouest	5.6	1	100.0	-	-
Sainte-Thérèse	76.0	3	99.3	0.4	0.3
Natashquan					
Offshore Ports					
Cap-aux-Meules	147.3	3	74.3	24.8	0.9

Note: 1) Compiled from monthly data.
2) This refers to the number of different buyers over the year. All buyers were not necessarily present at any one time.

Source: DFO, Unpublished Landings Data.

Table 2-14
Number of Registered Fishing Vessels by Province and Category, 1983

	Nova Scotia	New Brunswick	Newfoundland*	Prince Edward Island	Quebec	Total
Inshore						
Inshore	5866	2627	14969	1481	3433	28376
Nearshore	219	148	1445	2	207	2021
Offshore						
Midshore	55	37	15	4	36	147
Offshore	126	8	91	1	5	231
Total	6266	2820	16520	1488	3681	30775

* In Newfoundland, inshore vessels are ones less than 10.7m, nearshore vessels are between 10.7 and 19.8m.

Source: DFO, "Annual Statistical Review", 1983.

Though greater in numbers, inshore vessels are substantially smaller (in terms of length, tonnage and horsepower) and consequently have a much lower harvesting capacity than vessels in the offshore fleet. In 1983, average groundfish landings in Atlantic Canada by inshore and offshore vessels were about 28 and 1,680 tonnes, respectively. With these substantially higher average landings, the Atlantic offshore groundfish fleet consisting of about one percent of all licensed groundfish vessels, accounted for about 45 percent of total groundfish landings. Estimates of groundfish landings by fleet sector (inshore and offshore) for the Atlantic region are given in Table 2-15.

Table 2-15
Atlantic Region Groundfish Landings by Fleet Sector, 1983 (Tonnes)

	Atlantic Region		
	Landings	# of vessels(1)	Average Landings Per Vessel
Inshore (2)	431768	15592	27.7
Offshore	334,363	199	1,680.2

Note: 1) Includes only vessels licensed to fish groundfish.

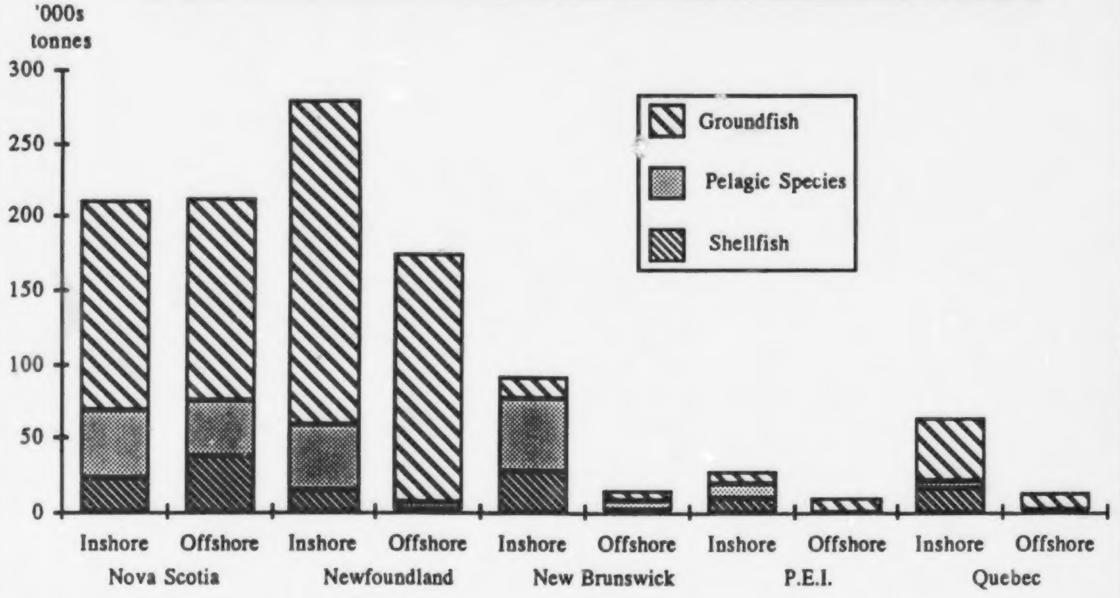
2) In Newfoundland, inshore vessels are ones less than 10.7 m, nearshore vessels are between 10.7 and 19.8 m.

Source: Canadian Fisheries; "Annual Statistical Review", 1983, DFO, "Atlantic Fishery License Directory".

The relative importance (in terms of landings) of the inshore and offshore fleets varies considerably from province to province. In Newfoundland and Nova Scotia in 1983, the inshore fleets accounted for about 57 and 51 percent of groundfish landings, respectively. The inshore fleets in New Brunswick and Prince Edward Island accounted for about 70 and 45 percent of landings, respectively. Quebec led all regions with about 80 percent of landings accounted for by the inshore fleet. The distribution of groundfish landings by vessel category and province is presented in Table 2-16. Inshore and offshore landings by species and province are depicted in Figure 2-6.

Most fishing communities in Atlantic Canada are characterized by many vessels each accounting for a small share of fish sales. Seller concentration is generally low, particularly in inshore ports. During 1985 the inshore study ports had an average of 32 vessels per port, and average landings of 74 tonnes per vessel. Average landings by the study port vessels are substantially higher than the average figures for all inshore vessels shown in Table 2-15 mainly because the former figure is calculated using only vessels active during 1985; the latter figure includes all vessels, active or not. The difference suggests a substantial number of vessels, presumably smaller ones with low capacity, are inactive. The use of different years to calculate the averages does not account for the difference because inshore landings were lower in 1985 than in 1983.

Figure 2-6: Landings by Province, Species and Fleet Sector, Atlantic Canada, 1983



Source: DFO "Annual Statistical Review", 1983
Prepared by Gardner Pinfold Consulting Economists Ltd

Table 2-16
Groundfish Landings by Province and Fleet Sector, 1983 (Tonnes)

	Inshore (<19.8 m)		Offshore (≥19.8 m)		Total
	Tonnes	%	Tonnes	%	
Newfoundland	220,863	56.8	167,812	43.2	388,675
Nova Scotia	143,788	51.0	138,258	49.0	282,046
New Brunswick	15,102	69.9	6,508	30.1	21,610
Prince Edward Island	9,105	44.9	11,179	55.1	20,284
Quebec	42,910	80.2	10,606	19.8	53,516
Total	431,768	56.4	334,363	43.6	766,131

Source: Canadian Fisheries; "Annual Statistical Review", 1983.

The Newfoundland inshore fishery (excluding the west coast) is characterized by many ports, but with relatively few vessels per port. Table 2-17 shows the inshore study ports in the Region have an average of 12 vessels with average landings of 136 tonnes per vessel. The average landings, the highest among the regions, are explained by the summer trap fishery which, though short-lived, ordinarily brings substantial quantities of cod. The study ports in the Scotia-Fundy Region have 37 vessels on average and average landings of 120 tonnes per vessel (Table 2-18). The Scotia-Fundy fishery lacks a trap fishery comparable to that of Newfoundland. The relatively high average landings of its vessels are accounted for in part by their greater average size and harvesting capacity and in part by the year-round fishery in southwest Nova Scotia.

The Gulf and Quebec inshore ports are comparable to Scotia-Fundy with respect to average vessels per port, with 47 and 33, respectively. With highly seasonal fisheries, though, the Gulf and Quebec ports have lower average landings per vessel, 70 and 64 tonnes, respectively. The Gulf average is brought up considerably by the Newfoundland ports at the mouth of the Gulf (e.g., Port aux Basques, Margaree, and Isle Aux Morts) whose vessels are able to fish year-round. Port averages for the Gulf and Quebec Regions are given in Tables 2-19 and 2-20.

Table 2-17
Average Inshore Groundfish Landings Per Vessel,
Newfoundland Region, 1985

Port	Inshore Landings (Tonnes)	No. of Vessels	Landings/ Vessel (Tonnes)
Inshore Ports			
Admiral's Beach	1604	16	100
St. Bride's	2234	5	447
Old Perlican	2971	32	93
Petty Harbour	2411	n/a	n/a
Port de Grave	437	14	31
Fogo	975	11	89
New Harbour	91	6	15
Seldom	1463	15	97
Englee	733	7	105
Joe Batt's Arm	1916	14	137
La Scie	980	5	196
Hermitage	1192	6	199
Burin	468	6	78
Harbour Grace	172	12	14
Francois	498	3	166
Triton	427	6	71
Twillingate	2248	21	107
Musgrave Harbour	2729	20	136
Valleyfield	1851	19	97
Herring Neck	1458	9	162
Bonavista	3066	8	383
Holyrood	6	n/a	n/a
Average	1425	12	136
Offshore Ports			
Burgeo	1268	8	159
Ramea	1115	5	223
Trepassey	1042	16	65
Gaultois	140	n/a	n/a
St. John's	1778	5	356
Harbour Breton	2396	15	160
Fortune	328	6	55
Marystown	45	1	45
Catalina	944	6	157
Grand Bank	96	1	96
Average	915	7	146

Source: DFO, Unpublished Landings Data.

Table 2-18
Average Inshore Groundfish Landings Per Vessel
Scotia-Fundy Region, 1985

Port	Inshore Landings (Tonnes)	No. of Vessels	Landings/ Vessel (Tonnes)
Inshore Ports			
Shelburne	5022	29	173
Yarmouth/Y. Bar	2639	34	78
Sambro	4581	51	90
Woods Harbour	5528	61	91
Clarke's Harbour	2812	48	59
West Head	5860	43	136
Meteghan	5202	17	306
Port Bickerton	1033	9	115
Digby	3923	31	126
Glace Bay	3541	86	41
Lower West Pubnico	4644	17	273
Eastern Passage	587	29	20
Wilson's Beach	509	38	13
South Side	3320	60	55
Saulnierville	2135	8	267
Port Morien	2060	33	62
West Port	5559	39	142
Average	3468	37	120
Offshore Ports			
Louisbourg	9738	40	243
Riverport	414	4	103
Petit de Grat	1348	17	79
Lunenburg	1631	37	44
Alder Point	1151	56	21
Canso	1425	47	30
Central Port Mouton	1336	33	40
North Sydney	1670	43	39
Average	2339	35	75

Source: DFO, Unpublished Landings Data.

Table 2-19
Average Inshore Groundfish Landings Per Vessel, Gulf Region, 1985

Port	Inshore Landings (Tonnes)	No. of Vessels	Landings/ Vessel (Tonnes)
Inshore Ports			
Beach Point	1037	21	49
Cheticamp	9165	79	116
Caraquet	1727	14	123
North Lake	466	68	7
Port aux Basques	9313	53	176
Trout River	1158	79	15
Cook's Harbour	2753	105	26
Cow Head	868	69	13
Point Sapin	298	20	15
Parson's Pond	105	16	7
L'anse au Loup, Lab	1344	117	12
Codroy	2369	40	59
Port aux Choix	6586	114	58
Anchor Point	1675	27	62
Pleasant Bay	962	15	64
Howard's Cove	541	18	30
Rose Blanche	3189	36	89
Lameque	4153	33	126
Burnt Islands	3292	37	89
Skinner's Pond	302	21	14
Port Saunders	2494	53	47
Black Duck Cove	1979	48	41
Isle Aux Morts	5538	25	222
Margaree (Nfld)	3408	16	213
Tignish Run	1157	n/a	n/a
Trout River	0.1	n/a	n/a
Average	2697	47	70
Offshore Ports			
Souris	2115	38	56

Source: DFO, Unpublished Landings Data.

Table 2-20
Average Inshore Groundfish Landings Per Vessel
Quebec Region, 1985

Port	Inshore Landings (Tonnes)	No. of Vessels	Landings/ Vessel (Tonnes)
Inshore Ports			
Rivière-au-Renard	9501	68	140
Paspebiac	661	15	44
Matane	794	9	88
Grande-Rivière	5389	42	128
Ste Anne des Monts	618	13	48
Cloridorme	2383	40	60
Harrington	671	44	15
Ruisseau-Chapados	63	7	9
Blanc Sablon	854	89	10
Newport (Pointe de)	7035	33	213
Rivière Saint-Paul	495	40	12
Anse à Beaufils	720	30	24
Gascons-Ouest	20	6	3
Sainte-Thérèse	1432	10	143
Natashquan	1221	54	23
Average	2124	33	64
Offshore Ports			
Cap-aux-Meules	205	4	51

Source: DFO, Unpublished Landings Data.

Buyer and Seller Ties

Vertical Integration

Vertical integration is confined almost exclusively to the offshore fishery and is characterized by a predominance of processor-ownership of fishing vessels.[8] All groundfish, scallop and lobster vessels 30.5 m and over are owned directly or indirectly by processing companies. About half the groundfish vessels and all scallop and lobster vessels between 19.8 and 30.5 m are owned directly or indirectly by processing companies. A summary of offshore groundfish fleet ownership by vessel length is given in Table 2-21.

Table 2-21
Offshore Groundfish Fleet Ownership by Vessel Category, 1985

	Midshore		Offshore	
	Vertically Integrated	Independent	Vertically Integrated	Independent
Newfoundland	2	-	80	-
Nova Scotia	16	1	39	-
New Brunswick	3	18	10	-
Prince Edward Island	4	-	1	-
Quebec	4	11	8	-
Atlantic Region	29	30	140	-

Source: DFO, unpublished licensing data, 1985.

Virtually all inshore vessels are owned by fishermen, though it is not unusual for processors to have an equity interest. There is some processor-ownership of the inshore fleet, and while there is no outright prohibition of processor-ownership of inshore vessels, DFO has attempted (since 1979) to exercise a policy of "fleet separation". Applications for vessel registration by processors are handled on a case by case basis.

Fishermen on offshore vessels are not employees in the strict legal sense of the term; they maintain some independence of action, though less now than in earlier years.

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[8] Some fishermen own small-scale processing facilities. The predominant group are Newfoundland and Quebec fishermen who produce saltfish. Also, a small number of fishermen in southwest Nova Scotia carry out limited processing and sell dressed fish directly in the U.S. market.

They are co-adventurers sharing in the value of the catch according to a predetermined formula referred to in the industry as the "lay arrangement".[9] Prior to the early 1980's, the vessel captain enjoyed considerable freedom in deciding where to fish and for what species. The fishing strategy was a simple one: maximize the share of the offshore quota. With the introduction of enterprise allocations in 1982 and much greater emphasis on fishing, not for volume, but to meet market requirements, the companies now exercise much greater control in directing their vessels' fishing effort.

The main implications of vertical integration for price formation are two-fold. First, landings are committed to the company owning the vessel and hence are not subject to competition for the catch from other buyers. This structural constraint to price competition is reinforced by contractual arrangements (collective agreements in most cases) between owners and fishermen. The second implication is a corollary of the first - the vertically integrated companies have a guaranteed source of supply for a substantial proportion of their overall raw fish requirements.

Mutual Dependence

Processors and fishermen are linked in informal ways. The situation in which most processors and inshore fishermen find themselves is one of mutual dependence. Processors who do not own and operate fishing vessels do not have a secure source of supply of fish. They depend on inshore fishermen. With few exceptions, fishermen do not own and operate processing plants and landing facilities, and do not have a ready means of disposing of their fish. They depend on processors.

The elements of mutual dependence are varied. In describing the processors' dependence, the operative word is secure. The processor provides fishermen with a range of chandlery, handling, transportation and financial services to obtain a secure supply of fish. These include day-to-day items such as gear, bait, ice and other fishing supplies; wharf and unloading facilities; and transportation services when necessary. Access to wharf and unloading facilities is ordinarily provided at no charge. Fishermen generally obtain supplies and services on credit against sales of fish. In some cases processors also complete settlement sheets on behalf of skippers and crew, and assist in completing income tax forms. Processors also assist with vessel financing, though if available evidence is to be believed, this means of securing allegiance is of limited importance.[10] In addition to these practical arrangements fishermen and processors are also tied by social relationships, a powerful factor in the small communities that characterize the fishing industry.

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[9] For unionized fishermen the lay arrangement and other terms and conditions of the relationship with the vessel owner are specified in the collective agreement.

The *quid pro quo* is the fishermen's agreement to supply fish exclusively to the processor providing these services. Empirical evidence suggests these relationships are very stable. Indeed it is not uncommon for a processor to refer to his suppliers as "my fishermen". Monthly sales transaction data for 1984 and 1985 for all vessels in the study ports reveal only a few instances of fishermen selling to more than one buyer. In all regions, only 5-10 percent of vessels reported sales to more than one buyer (Tables 2-22 to 2-25). The evidence indicates this limited shifting from one buyer to another occurs primarily during the summer months.

Table 2-22
Inshore Vessel Sales Transactions, Newfoundland Region, Study Ports, 1985

	# of Vessels	1 Buyer		2 Buyers		3 Buyers or more	
		#	%	#	%	#	%
January	29	29	100	0	0	0	0
February	34	34	100	0	0	0	0
March	33	33	100	0	0	0	0
April	36	30	83	6	17	0	0
May	71	71	100	0	0	0	0
June	175	169	97	6	3	0	0
July	220	195	89	22	10	3	1
August	256	239	93	16	6	1	0
September	217	207	95	10	5	0	0
October	139	133	96	6	4	0	0
November	36	32	89	4	11	0	0
December	30	30	100	0	0	0	0

Source: DFO, unpublished sales data.

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[10] In most areas in the Newfoundland and Gulf Regions, for example, processing companies are the source for less than one percent of vessel financing. Processors are the source for about five percent of financing for Nova Scotia vessels in the Gulf Region. DFO, *Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises in the Newfoundland Region, 1984;* DFO,*Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises, Gulf Region, 1983* . Costs and earnings studies carried out in the Scotia-Fundy and Quebec Regions do not identify processors as a source of financing.

Table 2-23
Inshore Vessel Sales Transactions, Scotia-Fundy, Study Ports, 1985

	# of Vessels	1 Buyer		2 Buyers		3 Buyers or more	
		#	%	#	%	#	%
January	102	100	98	1	1	1	1
February	147	137	93	10	7	0	0
March	139	131	94	7	5	1	1
April	222	213	96	8	4	1	0
May	367	338	92	27	7	2	1
June	571	535	94	30	5	6	1
July	745	700	94	39	5	6	1
August	765	719	94	41	5	5	1
September	698	670	96	22	3	6	1
October	610	575	94	30	5	5	1
November	260	245	94	13	5	2	1
December	158	152	96	5	3	1	1

Source: DFO, unpublished sales data.

Table 2-24
Inshore Vessel Sales Transactions, Gulf Region, Study Ports, 1985

	# of Vessels	1 Buyer		2 Buyers		3 Buyers or more	
		#	%	#	%	#	%
January	65	65	100	0	0	0	0
February	200	185	93	7	3	8	4
March	145	132	91	10	7	3	2
April	177	176	99	1	1	0	0
May	368	357	97	11	3	0	0
June	682	671	98	11	2	0	0
July	836	806	96	29	3	1	1
August	768	746	97	21	3	1	0
September	591	578	98	12	2	1	0
October	449	443	99	6	1	0	0
November	247	245	99	2	1	0	0
December	179	178	99	1	1	0	0

Source: DFO, unpublished sales data.

Table 2-25
Inshore Vessel Sales Transactions, Quebec Region,
Study Ports, 1985

	# of Vessels	1 Buyer		2 Buyers		3 Buyers or more	
		#	%	#	%	#	%
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0
April	38	37	97	1	3	0	0
May	213	189	89	20	9	4	2
June	331	308	93	21	6	2	1
July	460	417	91	33	7	10	2
August	335	316	94	18	5	1	0
September	242	239	99	3	1	0	0
October	163	162	99	0	0	1	1
November	45	45	100	0	0	0	0
December	0	0	0	0	0	0	0

Source: DFO, unpublished sales data.

Entry and Exit Conditions

Barriers to Entry

There are significant barriers to entering both the harvesting and processing sectors of the fishing industry in Atlantic Canada. These vary in nature from region to region and in severity depending on whether entry is to the inshore or offshore sector of the industry.

An important element in Canada's management regime is to restrain fishing effort through limited entry.[11] In order to participate in the Atlantic fisheries a commercial fisherman is required to hold a personal fishing license. A corporate license is held by the vertically integrated companies. A separate license (termed a "limited fishery license") is required for each species fished; many inshore fishermen hold multiple licenses. Groundfish and pelagic licenses are gear-specific, i.e., a separate license is required for each type of gear used (e.g., trawl, longline, gill net, purse seine). Moreover, all fishing vessels must be registered. As a condition of registration, vessels must meet certain minimum standards specified in the regulations under the Fisheries Act.

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[11] For a good discussion of the issues and events leading to limited entry licensing see, C.R. Levelton, *Toward an Atlantic Coast Commercial Fisheries Licensing System*, 1981.

Limited entry was introduced in 1967 and was initially confined to the lobster fishery. By 1973 it had been extended to the scallop and groundfish fisheries (inshore and offshore), though not all gear-types in the latter fishery were covered until 1980 (mobile gear in 1979 and fixed gear in 1980). With the extension of coverage in 1980, the entry of new vessels was effectively barred. Though entry is not permitted, the acquisition of a license by one fisherman from another is possible. When a fishing vessel is sold the seller may reserve the license in his name if he intends to replace the vessel sold, or he may apply to have the license re-issued to the new owner if he intends to leave the fishery. Among the conditions the purchaser of the vessel must meet to be eligible for the re-issuance of the license are that he is a full-time fisherman and the official registered owner of the vessel.

The federal government's action to restrict growth stemmed from its concern about overcapacity in the harvesting sector and the long term effects on fishermen's incomes and the viability of fishing enterprises. There was also concern about increased pressure from inshore fishermen for greater quota and the effect this would have on the distribution of TAC's between the inshore and offshore sectors. By itself, of course, limited entry is not an effective means of restraining fishing effort since it does not address the question of vessel capacity. To complement limited entry, rules were introduced restricting the size of replacement vessels and the frequency with which they could be replaced. Even with these controls, excess harvesting capacity remains a serious problem in many areas in the Atlantic region.

There are no comparable federal restrictions governing entry into the processing sector. All plants conducting business outside provincial boundaries must be federally registered and all plants are required to be licensed by provincial authorities. Registration and licensing are generally not intended to restrict entry, but are meant to ensure plants meet health, safety and other standards. In view of the excess processing capacity in Newfoundland, the provincial government in 1981 adopted a policy restricting entry. No new plants have been licensed to operate since then.

The barriers to entering the processing sector are mainly economic and are related to capital costs and access to supplies of raw material. Plants supplied by the seasonal inshore fishery generally produce fresh or salted product and have low capital costs. Inshore fishermen are at least nominally independent and for new entrants would represent at least a potential source of supply. Overcoming existing informal buyer-seller ties is the main problem likely to be faced by a new entrant. In certain areas in the region this could be difficult and could amount to an effective barrier to entry.

Entry into the year-round offshore trawler-supplied branch of the processing sector would be more difficult. Capital costs are high because plants require expensive freezing and cold storage capacity. The more serious barrier to entry would likely be lack of access to raw material supplies; all trawlers are part of vertically integrated companies. A prospective entrant would face the difficult task of developing its own harvesting capacity by acquiring the vessel(s) and license(s) from an existing company. Not only would existing companies be less than enthusiastic about assisting potential competitors in this way, but the costs associated with the acquisition would be very high.

The relative ease with which a new company can establish an inshore-supplied plant is supported by recent developments in the industry. Between 1979 and 1984 the number of groundfish plants in the Maritime Provinces and Quebec grew from 230 to 285, an increase of just under 25 percent. Most of this growth occurred in southwest Nova Scotia. While some of these plants are owned by existing participants in the industry, many represent the investment of new entrants. More significantly, perhaps, all of these plants are inshore-supplied; there has been no entry into the offshore-supplied branch of the industry and no new plants have been established. In Newfoundland, the number of plants processing groundfish appears to have declined from 214 to 130. It is not clear whether this decrease is real or a reflection of some definitional change. An estimate of the change in the number of plants by province, 1979-1984, is given in Table 2-26.

Impediments to Exit

The fishing industry in Atlantic Canada is an important source of employment and income. It forms the economic base of hundreds of communities throughout the region. In most communities there is no alternative economic activity. While many of the participants are afforded a marginal existence, exit from the industry is not easy. From time to time assets may change hands, but in the face of over-capacity in both the harvesting and processing sectors, the number of participants, if anything, has increased. This is not fortuitous. The impediments to exit from the industry are more or less directly proportional to its economic importance. Through an elaborate structure of programs and with periodic financial rescue packages, government has insulated the industry from direct exposure to the rigours of the marketplace.

Table 2-26
Atlantic Groundfish Processing Plants by Product Type, 1979 and 1983

	Registered Plants		Type of Operation					
			Fresh/Frozen		Salt/Dry		Canned	
Province	1979	1983	1979	1983	1979	1983	1979	1983
Newfoundland	214	130	132	123	76	64	10	-
Nova Scotia	154	182	87	142	122	151	1	-
New Brunswick	31	40	18	43	21	24	10	3
Quebec	25	33	16	33	9	20	-	-
Prince Edward Island	20	30	19	38	11	19	8	9
Total	444	415	229	378	239	278	29	12

Source: DFO, Atlantic Shore Processing Capacity Study, 1983; Marvin Shaffer & Associates, Ltd., "Structure, Behaviour and Performance of the Atlantic Groundfish Industry With Special Reference to the Quality Enhancement Program", 1981.

It is beyond the scope of this study to describe and assess all the various impediments to exit from the industry sponsored by the federal and provincial governments.[12] A brief overview will suffice. Essentially the measures fall into two categories, financial and non-financial. Several of these measures would assist entry to the industry, but by reducing the individual's or company's financial exposure these measures also make it easier to continue to operate during times of poor landings or low prices. Among the financial measures are capital assistance grants to processors and vessel subsidies to fishermen, and operating assistance in the form of periodic price support, gear and insurance subsidies, and unemployment insurance. The non-financial measures include provision of infrastructure such as wharves and ice-making and bait holding facilities, and services such as training programs.

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[12] Nor is it necessary to do so; they have been well documented elsewhere. See, for example, United States International Trade Commission, *Conditions of Competition Affecting the Northeastern U.S. Groundfish and Scallop Industries in Selected Markets*, 1984; Marvin Shaffer & Associates Ltd., *Structure, Behaviour and Performance of the Atlantic Groundfish Industry with Special Reference to the Quality Enhancement Program*, 1981.

The most celebrated examples of impeding exit occurred in the mid-1970's and early 1980's, when the collapse of substantial segments of the industry (mainly the vertically integrated companies) was prevented by the direct infusion by goverments of $350 to $450 million. A prominent feature of the 1983 rescue was the restructuring of the industry resulting in the disappearance of a number of companies and the assimilation of their assets into two large organizations. In effect, there was virtually no exit of vessels or plant and equipment from the industry. By virtue of their scale, these bailouts rank as exceptional events. But similar events occur on a smaller scale annually. Typically, the closure of a handful of plants in the region each year is prevented through some form of intervention by government.

Impediments to exit by processors lead to overcapacity and would tend to increase competition for supplies of raw fish in the long run. In many industries such competition would lead to increases in raw material prices. Upward pressure on prices is less likely in the fish processing industry because processors rely heavily on buyer-seller ties and non-price competition to secure supplies of raw material.

Arguably the greatest impediments to exit facing fishermen are the low opportunity costs of labour and capital in most areas (alternative sources of employment for the individual and his vessel are scarce), and the availability of unemployment insurance (UI). Fishermen are covered by UI under two separate programs, one providing regular benefits and the other special fishermen's benefits. Most fishermen on offshore trawlers and scallop draggers are considered to be employees and qualify for regular benefits.

Coverage of self-employed fishermen is achieved through the UI Act's "Part V Fishermen's Regulations" that allow fishermen to participate in the program on somewhat the same basis as regular claimants. Fishermen are classified as either year-round or seasonal depending on the duration of their operations. Approximately 90 percent of fishermen claimants fall into the seasonal category. They must be able to show they are not eligible for regular or year-round benefits, and must have 10 to 14 weeks of insurable employment with at least six of these in fishing. For fishermen with 15 or more weeks of insurable employment in fishing, the weekly benefit paid is based on the 10 *best* weeks. For those with fewer than 15 weeks, the benefit paid, as for other workers, is based on average weekly insurable earnings during the qualifying period.

In 1984 about 35,000 fishermen drew benefits totalling $163.4 million from the program, for an average claim of about $4,700 (by contrast regular UI claimants had an average claim of about $4,000).[13] The greatest number of claimants (35 percent) was from Newfoundland, followed by Nova Scotia (22 percent). The distribution of benefits by province was roughly proportional to the distribution of claimants.

UI represents an important source of income for fishermen across Canada, on average accounting for about 15 percent of total net income. Fishing itself accounts for about 65 percent of total income with the balance divided about equally between earned income from other employment and income from other sources. There are wide differences among regions and provinces in the relative importance of UI as a source of supplementary income. In the Atlantic Provinces as a whole, UI benefits make up about 20 percent of total income. This varies from a high of about 30 percent in Newfoundland, Quebec and Prince Edward Island, to a low of about 12 percent in Nova Scotia. By contrast, UI benefits account for less than 10 percent of total income of inland fishermen and those in British Columbia.[14]

The UI payments are generally regarded by observers of the industry as a form income support. Undoubtedly UI plays this role; indeed, this was an important part of the rationale for making fishermen eligible in the first place and for the continuation of coverage to this day. But such support has the effect of encouraging participation in an already overcrowded industry and perpetuating the very problem it is intended to address.[15] The problem is particularly acute in Newfoundland, where in a recent discussion paper the Economic Council of Canada noted, "If an alternative income maintenance scheme were in place, there seems little doubt that the thousands of people who fish for the minimal number of weeks to qualify for UI or who cut fish for the minimal number of weeks to qualify for UI in a small seasonal fish plant would leave the industry voluntarily".[16]

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[13] Statistics Canada, 73-201.

[14] CEIC, *Income Protection/Stabilization and the Fishing Industry*, 1982.

[15] See, for example, the Task Force on Atlantic Fisheries, *Navigating Troubled Waters*, 1982; and, the Commission on Pacific Fisheries Policy, *Turning the Tide*, 1982.

[16] Lawrence Copithorne, *Newfoundland Revisited*, Discussion Paper No. 296, Economic Council of Canada, 1986, at p. 6-13.

Ordinarily, impeding the exit of suppliers from an industry would tend to depress prices because supply, and therefore competition among sellers, would be greater. A similar effect on port prices would not necessarily occur as a result of impeding the exit of fishermen. This is so because buyer-seller ties tend to minimize price competition, and because the supply of fish tends to be limited by quota rather than harvesting capacity.

To the extent entry and exit conditions have an impact on prices, the net effect is ambiguous.

3. Summary and Conclusions

Port market structures in Atlantic Canada vary, but may be described generally as either oligopsonistic or monopolistic (bilateral). Inshore ports in the Maritimes and Quebec fall into the oligopsonistic category. Most ports have between one and three buyers, with the largest often accounting for upwards of 90 percent of purchases. In contrast, the selling side typically consists of a large number of at least nominally independent fishermen none of whom is sufficiently large to influence the market. The market structures in Newfoundland more closely approximate bilateral monopolies, with minimum prices established through collective bargaining between processors and fishermen's unions. Buyer concentration is high, but unionization provides fishermen a measure of countervailing power. In offshore ports throughout Atlantic Canada the "sellers" form part of vertically integrated companies and accordingly lack the independence to operate competitively.

Buyer and seller ties are important characteristics of market structure in both the offshore and inshore sectors of the industry. Buyer-seller ties in the inshore sector are informal. The relationship may be characterized as one of mutual dependence. The fisherman agrees to sell his fish to a particular processor in exchange for an agreement by that processor to buy all fish (at the going price) and to provide a range of handling, transportation and other services. Though the ties are informal, they are stable and strong enough to rule out meaningful price competition in most port markets. In the offshore sector the ties are formal; processing companies own the fishing vessels that supply most of their raw material requirements. The main implication of vertical integration for price formation is that landings are committed to the vessels owner and hence are not subject to competition from other buyers. The structural constraint to price competition is reinforced by contractual arrangements (collective agreements in most cases) between owners and fishermen.

CHAPTER THREE
PRICE FORMATION

1. Sales Methods

One of the main objectives of this study is to assess whether port markets are effective in producing the quantity and quality of fish required by final product markets. Port markets may be said to be effective if they transmit information regarding changes in consumer demand expressed in wholesale and retail markets correctly and quickly to fishermen via appropriate price changes. Effectiveness, then, depends very much on the pricing mechanism, which in turn is a product of the port market structure and the nature of the relationship between buyers and sellers.

The sale of fish is transacted using methods that vary by species, region and fleet sector. They fall into one of two general categories, market and non-market. We define market transactions as ones where prices have the potential to be sensitive to changes in final product markets: these are direct sales with prices negotiated on a day-to-day basis, "blind hail" auctions, and collective agreements with provision for variable prices. We define non-market transactions as ones where prices do not have such potential: these are sales subject to fixed prices specified in collective agreements, "sales" at fixed prices within vertically integrated companies, contract sales with fixed prices, and pre-season price agreements with post-season adjustments.

In this study we are concerned primarily with sales of fish effected through market transactions: mechanisms that offer at least the potential for transmitting market preferences to fishermen through ex-vessel price adjustments. Before presenting estimates of sales falling into each category (i.e., market and non-market), it is useful to describe the various methods and explain the basis for their categorization.

Market Transactions

Direct Sales

This method involves an arms-length transaction with prices established on a day-to-day basis. The transaction may be genuinely at arms-length or only nominally so, depending on the strength of informal buyer-seller ties. The important point is this method offers at least the potential for transmitting to fishermen, quickly and accurately, preferences expressed in final product markets. Virtually all groundfish caught by inshore and nearshore fishermen in the Maritimes and Quebec, and all lobster and inshore scallops in the Atlantic region are sold through direct sales.

Blind Hail Auction

This method involves a genuine arms-length transaction with prices established on a day-to-day basis. The auction is carried out from the fishing vessel while still at sea, with the skipper receiving bids from prospective buyers by radio-telephone. Use of this method is not widespread and is generally confined to highly-valued species caught in limited numbers, such as halibut.

Collective Agreements with Variable Prices

This method is confined to the offshore scallop fishery and applies to the Nova Scotia-based fleet of 75 or so active scallop draggers owned by vertically integrated processing companies. All collective agreements contain a clause similar to the following: "The price of scallops will vary from time to time up or down depending upon market conditions, and in all cases will not be below the going price for deep sea scallops in Nova Scotia." No guidance is provided in the agreements on what the "going price for deep sea scallops in Nova Scotia" means.

Non-Market Transactions

Collective Agreements with Fixed Prices

The transfer of fish at prices specified in collective agreements is the single most important sales method in terms of the quantity of fish involved and the number of fishermen. It covers virtually all groundfish caught by inshore and offshore fishermen in Newfoundland and most groundfish caught by offshore fishermen in the rest of Atlantic Canada.

Groundfish prices in the offshore sector are prices in a nominal sense only. Since fish caught by company trawlers belongs to the company, there is no sale in the sense of a market transaction. Fish is transferred from one branch of the company to another. The need for a price arises from the traditional method used to pay fishermen, the so-called "lay arrangement", whereby fishermen are paid a fixed share of the value of the catch. This traditional method has been incorporated in collective agreements. Price is a necessary element in the revenue equation determining value, and hence, the income to be shared among the vessel's crew. But the companies and the unions negotiate fishermen's incomes, not fish prices *per se*. Prices are not set according to prevailing market conditions but with a target income in mind, recognizing that vessel landings (the other element necessary to establish value) are fairly predictable from year to year.

These so-called offshore prices are lower, in some cases much lower, than port market prices established through direct sales in the non-unionized inshore fishery. The data in Table 3-1 show inshore prices in Scotia-Fundy are some 50 percent higher than offshore prices in the region, and five to six times higher than offshore prices in Newfoundland. The inshore prices for Scotia-Fundy in Table 3-1 are based on average prices for the study ports, many of which are located in southwest Nova Scotia where prices are among the highest in Atlantic Canada. Average prices for the region as a whole are lower. See, for example, Table 3-5.

There are also significant differences in corresponding offshore prices between the Scotia-Fundy and Newfoundland Regions and between trawler companies within the Newfoundland Region. The inter-regional differences reflect the traditional practices of the companies and unions. Under the terms of the lay arrangements in the respective collective agreements, Newfoundland crews share *total* revenues after deducting costs of provisions, while in Scotia-Fundy, the crews share a *percentage* of revenues (37 percent) after deducting costs of provisions. To maintain a rough equality in incomes under these share arrangements, prices are structured so as to arrive at the appropriate amount of revenue to be shared; lower prices in Newfoundland mean lower total revenues *all* of which are shared; higher prices in Scotia-Fundy mean higher revenues only *a part* of which are shared.

The difference in prices between companies in Newfoundland is based on quality considerations. The price structure set out in the 1985 collective agreement with National Sea Products provides an incentive for fishermen to land better quality fish. Factors affecting quality include the duration of the tow, the quantity of fish in the net, and on-board handling. For each species, a different price is paid for each of four standards of quality. Prices vary widely; in the case of market cod, for example, the 1985 price ranges

Table 3-1
Offshore and Inshore Prices for Selected Species, Newfoundland and Scotia-Fundy Regions, 1985

	Offshore			Inshore	
	Newfoundland (1)		Scotia-Fundy (2)	Newfoundland (3)	Scotia-Fundy (4)
	National Sea	Fishery Products International	National Sea	Union(5)	Non-Union
	$/kg				
Cod (Market)	A: 0.1382 B: 0.1036 C: 0.0691	0.1195	A: 0.4455 B: 0.3300 C: 0.2200	0.4510	0.6335
Haddock	A: 0.1536 B: 0.1152 C: 0.0768	0.1324	A: 0.6160 B: 0.4620 C: 0.3080	0.4510	0.9801
Flounder (Yellowtail)	A: 0.1133 B: 0.0849 C: 0.0566	0.0992	A: 0.3025 B: 0.2255 C: 0.1485	0.3355	n.a.

Sources:

1. As per the collective agreements between the companies and the United Food and Commercial Workers, Local 1252, effective January 1, 1985 - October 31, 1988

2. As per the collective agreement between the company and the Canadian Brotherhood of Railway, Transport and General Workers, Local 611, effective January 1, 1985 - December 31, 1988.

3. As per the collective agreement between the Fisheries Association of Newfoundland and Labrador and the United Food and Commercial Workers, Local 1252, effective June 1, 1984 - May 31, 1985.

4. DFO, unpublished landings data, 1985. These prices are an average for 1985 for the inshore study ports in Scotia-Fundy shown in Figure 2-4.

5. These prices are for market sized grade "A" as specified in the collective agreement. See Table 3-6 for a detailed breakdown of prices according to size, gear type and quality.

from $0.138/kg for "A" grade, to $0.069/kg for "C" grade, a difference of 100 percent. A lower price is paid for rejected fish. Since introducing this price structure, National Sea reports a significant improvement in the proportion of "A" grade fish landed. Fishery Products International has not yet introduced a quality-based price structure. In 1985, for example, a single price of $0.119/kg, was paid for all acceptable market cod.

Circumstances, and resulting prices, are different in the unionized sector of the inshore fishery where prices are set through collective bargaining.[1] Fishermen and processors are at least nominally independent and, unlike the offshore sector, the sale of fish amounts to more than simply an intra-company transfer. Prices are set with market conditions and operating costs in mind, not a target income. They are minimum prices; the actual prices received by fishermen may fluctuate above those set out in the collective agreement depending on prevailing market conditions, but according to union officials, they rarely do.

Inshore prices in Newfoundland are negotiated subject to three important constraints: to avoid internal disputes within the union, prices must be fairly uniform across the province; they must be high enough to ensure fishermen continue to fish; and, they must be low enough to enable all processors to operate profitably.[2] In practice, the common denominator that tends to determine price is the ability to pay of the province's least profitable plants. This ensures the entire catch is sold and processed, and all plants continue to function, with the more efficient plants operating at a healthy profit. Ability to pay is a function of plant operating costs and the value of products produced. Distance from markets, seasonality of operations and a generally lower valued product mix mean many of Newfoundland's inshore plants are able to pay less than their counterparts elsewhere in Atlantic Canada.[3] This is clear from the data shown in Table 3-1. Market-determined inshore prices for cod and haddock in Scotia-Fundy are about 50 and 100 percent higher, respectively, than in Newfoundland.

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[1] Collective bargaining between of inshore fishermen and processors is confined almost exclusively to Newfoundland where it is the rule. Inshore fishermen in New Brunswick have the right to bargain collectively and union organizers have had some success, notably among lobster fishermen along the north shore. Some inshore fishermen in Nova Scotia and Prince Edward Island belong to unions but do not have collective bargaining rights. There appears to be little interest gaining that right.

[2] To complicate matters the bargaining agent for fishermen, the United Food and Commercial Workers, also represents fish plant workers in Newfoundland. This puts the Union in an awkward position because it has to achieve an acceptable balance between the income expectations of both groups. Since plants are price takers in world markets, any gain made by plant workers must come at the expense of fishermen and vice versa.

Vertical Integration

Not all vertically integrated companies are unionized; the exceptions are the smaller ones in the Scotia-Fundy Region. These companies set prices for groundfish outside a formal collective bargaining framework. Though a different approach is taken, the prices are nonetheless notional in the same sense as those found in collective agreements. They may be higher or lower depending on the terms of the lay arrangement.

Contract Sales

This method is one of the most straightforward and also one of the least used. At the beginning of the season, buyers and sellers enter into an agreement on the terms and conditions of the sale of fish. Use of this method is confined almost exclusively to the seine herring fishery in Scotia-Fundy. A minimum price effective for the season is negotiated between the approximately 50 processors in the region and Fundy Coordinators, the marketing branch of the Atlantic Fishermen's Herring Cooperative, acting on behalf of fishermen on the 41 vessels in the seine fleet. Though negotiated on the basis of market conditions, we refer to the arrangement as a non-market transaction because the contract price is insensitive to any changes in market conditions during the season. Once a minimum price is established, fishermen are left to deal directly with individual processors. A fisherman may be able to negotiate a slightly better price if he is able to meet a specific delivery schedule. Meeting a schedule is possible because the fleet operates subject to individual boat quotas. Quality is not a consideration in price formation since the fishery is now effectively a roe fishery. Roe does vary in quality, but the control over quality rests primarily with the processor.

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[3] This fact has not been lost on the opponents of unionization of inshore fishermen in the Maritimes. To suggest (as some have done) that unionization itself has caused this and that it necessarily follows that a similar pattern would be expected in the Maritimes is, of course, misleading. Inshore prices in Newfoundland are very much a function of the structure of the industry there and the particular approach taken to collective bargaining.

Agreements with Post-Season Adjustments

This method involves setting a provisional price at the beginning of the season based on expectations about market conditions. If market conditions are such that actual prices exceed expectations, a post-season adjustment reflecting this is made. This method is confined to the lobster fishery in the Gulf Region, notably to cooperatives in Prince Edward Island and, more recently, to southern New Brunswick. This sales method is included in the non-market category because any adjustment is made at the end of the season and not in response to a current change in market conditions. Moreover, the nature of the fishery is such that unless there is a major decline in prices, market conditions have little influence on fishermen's behaviour on a day-to-day basis; the season is short and fishermen are restricted in the number of traps they can set.

Sales by Market and Non-Market Transaction

An analysis of landings by gear type, vessel length and species using 1983 data suggests that about one-third of the total quantity of fish and shellfish involved in ex-vessel sales transactions in Atlantic Canada falls into the market transaction category, while about two-thirds falls into the non-market category.[4] There are wide variations by species group. For groundfish, the most important species group in the region, only about 30 percent of landings by quantity is sold through market transactions. For shellfish, the quantity sold through market transactions exceeds 90 percent of total landings. The corresponding figure for pelagic species is about seven percent. Aggregate sales by category and species for the Atlantic coast fishery are shown in Figure 3-1.

Owing to differences in institutional arrangements and in the structural characteristics of their fishing industries, there is also considerable variation among provinces in the proportion of sales by market and non-market transaction. With virtually a completely unionized industry, effectively 100 percent of groundfish sales in Newfoundland are non-market transactions. At the other extreme are New Brunswick, with no vertically integrated offshore sector, and Quebec, with limited vertical integration. All sales of groundfish in New Brunswick are market transactions, while about 80 percent of sales in Quebec fall into the market category. In Nova Scotia and Prince Edward Island, there is a fairly even distribution between the two categories: just over half the groundfish sales in Nova Scotia are market transactions, about 45 percent are market transactions in Prince Edward Island. The estimates of sales by category and species group for each province are depicted in Figure 3-2.

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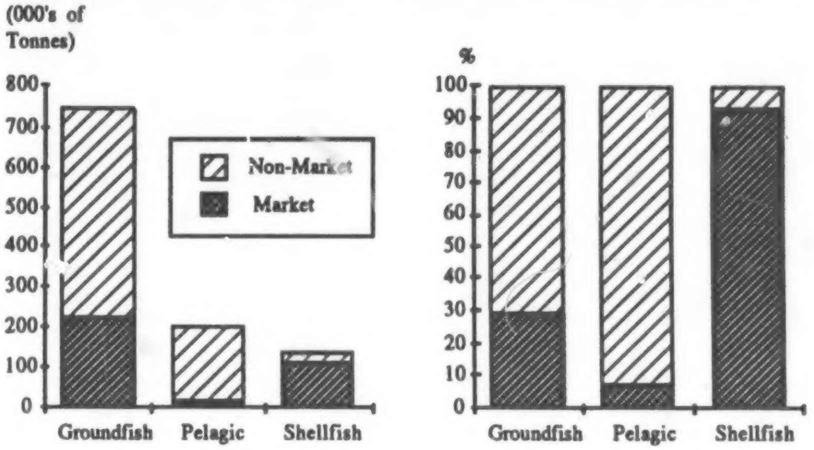
[4] DFO does not collect sales data by method of transaction. These estimates are derived by combining tonnes landed by gear type and vessel length with tonnes landed by species for each province as reported in DFO, *Canadian Fisheries, Annual Statistical Review, 1983*, Tables 46-50, 57-61. Due to the nature of the data, these estimates should be regarded as indicative, not definitive.

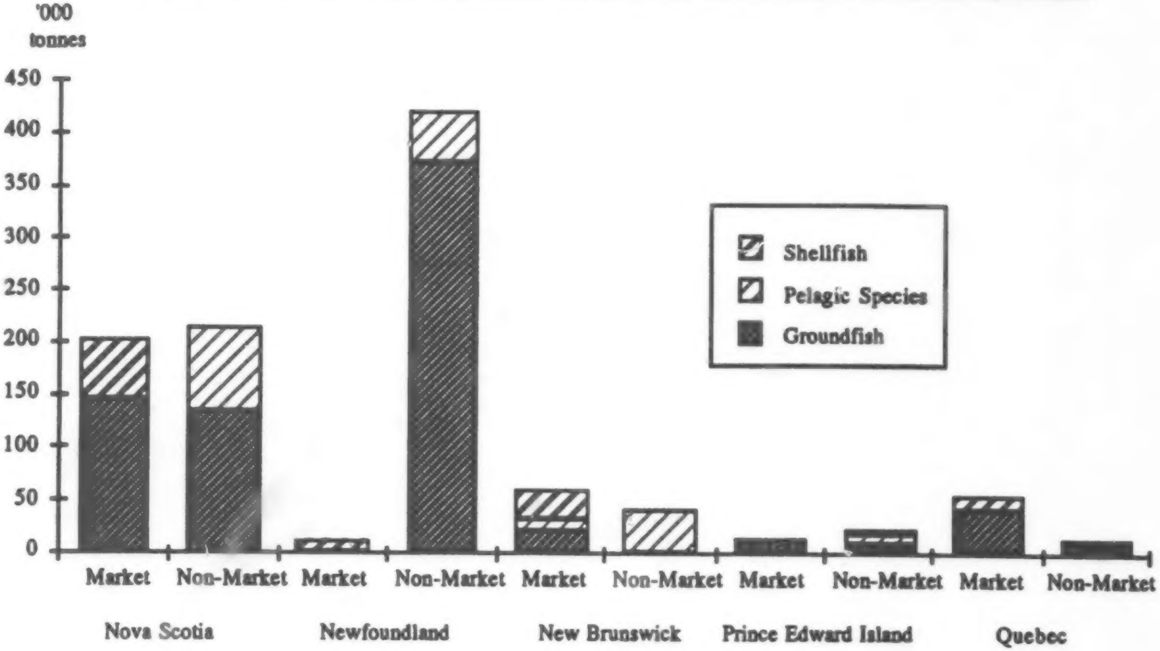
Figure 3-1: Quantity of Landings Sold Through Market and Non-Market Transactions, Atlantic Coast Fishery, 1983.



Source: Compiled From DFO, "Annual Statistical Review", 1983.
Prepared by Gardner Pinfold Consulting Economists Limited.

These estimates lead to an important conclusion. With such a high proportion of ex-vessel sales transactions falling into the non-market category (about 70 percent by quantity), *the potential for port market prices to be sensitive to day-to-day changes in final product markets is limited to only about 30 percent of ex-vessel groundfish sales.* Whether such transactions are *actually* sensitive to day-to-day changes in final product markets is addressed in the following sections. The question of whether port prices are sensitive to longer-term price trends in final product markets is not at issue. There is ample evidence to indicate they are, at least in the sense of following *general* price movements. But except in a few isolated instances where fish is sold subject to market transactions, the structural characteristics of the port market have inhibited the development of price behaviour that is sensitive to differences in the quality of raw fish. Interestingly, it is in the context of non-market transactions that at least some form of quality-based pricing has evolved. This is

Figure 3-2: Landings Sold Through Market and Non-Market Transactions, 1983



Source: Compiled From DFO, "Annual Statistical Review", 1983.
Prepared by Gardner Pinfold Consulting Economists Limited.

the case under National Sea Products dock-side grading scheme for offshore landings, and under the collective agreement governing inshore landings in Newfoundand.

2. Price Levels and Price Movement

Factors Affecting Price

General Considerations

The price of fish in final product markets is determined by the interplay of demand and supply. The demand for fish is affected by a number of factors. In the aggregate, demand is directly related to population size and per capita consumption. Consumer tastes and preferences together with income levels and prices for fish substitutes (e.g., poultry and red meat) affect demand in the long-run. Variations in demand in the short-run are accounted for mainly by seasonal consumption patterns; in Canada and the U.S. demand tends to be higher in winter than summer.

Among the factors affecting supply are short-run variables such as resource characteristics and weather, both of which may contribute to daily and seasonal fluctuations in landings in Canada and the U.S. In the long-run, the state of the resource and changes in harvesting capacity have an important bearing on supply. Canadian fishery regulations in the form of catch quotas or restrictions on access to the fishery, and U.S. restrictions on access to markets in the form of import quotas and duties also have a direct affect on supply.

The port market operates as one link in the chain of market transactions required to move fish from its area of capture to the final consumer. Since the fishing industry exists to satisfy consumer wants, the chain of market transactions begins with the consumer. The demand for fish in the port market, in other words, is a derived demand. It derives from the demand for fish products in wholesale and retail markets. Price formation, then, starts at the retail level. Prices act as signals to wholesalers and in turn to processors indicating what types of fish products are desired and whether to increase or decrease supply of a particular product.

Vertically integrated processing companies respond to these signals by simply directing the level and timing of fishing effort of their vessels to particular species. The ability of companies to respond in this way is facilitated by the system of enterprise allocations in effect since 1982. Since companies do not compete among themselves for raw material, quality can be taken into consideration through the price structure. To date, though, only one company has adopted a quality-based pricing system.

The matter is not so straightforward for processors dealing with independent inshore fishermen. They do not have the same degree of control over supply as the integrated companies. Under competitive conditions, they would be expected to transmit prices reflecting consumer demands to fishermen through an appropriate set of port market prices. These prices would be expected to influence all aspects of fishing behaviour including fish quality, the timing of landings and quantities of each species caught.

The U.S. Market

The final markets for fish produced in Atlantic Canada are mainly outside the region. Approximately 85 percent of production is exported from Canada, principally to the U.S. Exports to the U.S. have enjoyed steady growth in recent years, although there has been some change in product mix in response to market requirements. In 1984, the U.S. was the destination for an estimated 70 percent of Atlantic Canada's production by quantity and value. Figure 1-12 (page 19), shows exports of cod and haddock to the U.S. exceeding 70 and 90 percent of production, respectively, in recent years.

The importance of the U.S. market for Canadian groundfish has increased for two reasons: in response to a growing demand for fish and due to the inability of the U.S. fishing industry to keep pace with that demand. Between 1982 and 1985, the U.S. demand for groundfish increased by 20 percent. Over the same period, total U.S. groundfish landings (east and west coast) increased by about five percent. This modest increase would not have been possible except for the substantial increase in landings from the Alaska pollock fishery. This fishery alone compensated for the considerable decline in landings elsewhere in the U.S., particularly in the New England and Gulf states. In the important New England market, for example, landings of the principal groundfish species, cod, haddock and flounder, dropped by 47 percent between 1982 and 1985.[5]

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[5] U.S. Department of Commerce, National Marine Fisheries Service, *Fisheries of the United States*.

Imports have made up the difference. Between 1982 and 1985, U.S. imports of fresh and frozen groundfish from all sources increased by about 23 percent. Canada is the major exporter to the U.S., in 1985 accounting for just over 40 percent of U.S. imports by quantity. The Canadian fishing industry was able to take advantage of the market conditions in the U.S. in two ways. First, by increasing overall exports; over the 1982-1985 period, Canadian exports grew by about 15 percent by quantity. Second, by shifting production and exports into more profitable product forms. The dramatic decline in landings by New England fishermen resulted in reduced supplies of fresh fish on the New England market. Processors in Atlantic Canada responded to the imbalance between demand and supply in this market by shifting away from frozen fillet and block production and increasing the production and export of dressed and filleted fish in the fresh form. The major change occurred in the production of dressed fish, as exports showed a two and a half fold increase between 1982 and 1985. Over the period, the proportion of Canadian fish exported in fresh form increased from about 17 to 39 percent.[6] Annual groundfish exports by product form are presented in Table 3-2.

The seasonality of exports varies by species and product form. The degree of seasonality, once considerable, has diminished in recent years due to changing consumption patterns and to the decline in groundfish landings by New England fishermen.[7] The changes in monthly exports (1981-1985) by product form for various species are illustrated in Figure 3-3.

> *Cod, Dressed.* Exports showed considerable seasonal variation between 1981 and 1983, with shipments rising in the autumn and early winter and dropping to negligible quantities in summer. In general, the pattern of exports reflects the seasonality of fishing effort and landings in New England. In winter, with reduced U.S. landings, Canadian processors are attracted by high prices for fresh whole fish. With increased U.S. landings during summer, fresh fish prices fall and Canadian processors switch to more profitable frozen and salt products. The degree of seasonality declined somewhat during 1984 and 1985, with the substantial decrease in New England landings. This is evident from Figure 3-3, as is the overall increase in exports in the same months from year to year.

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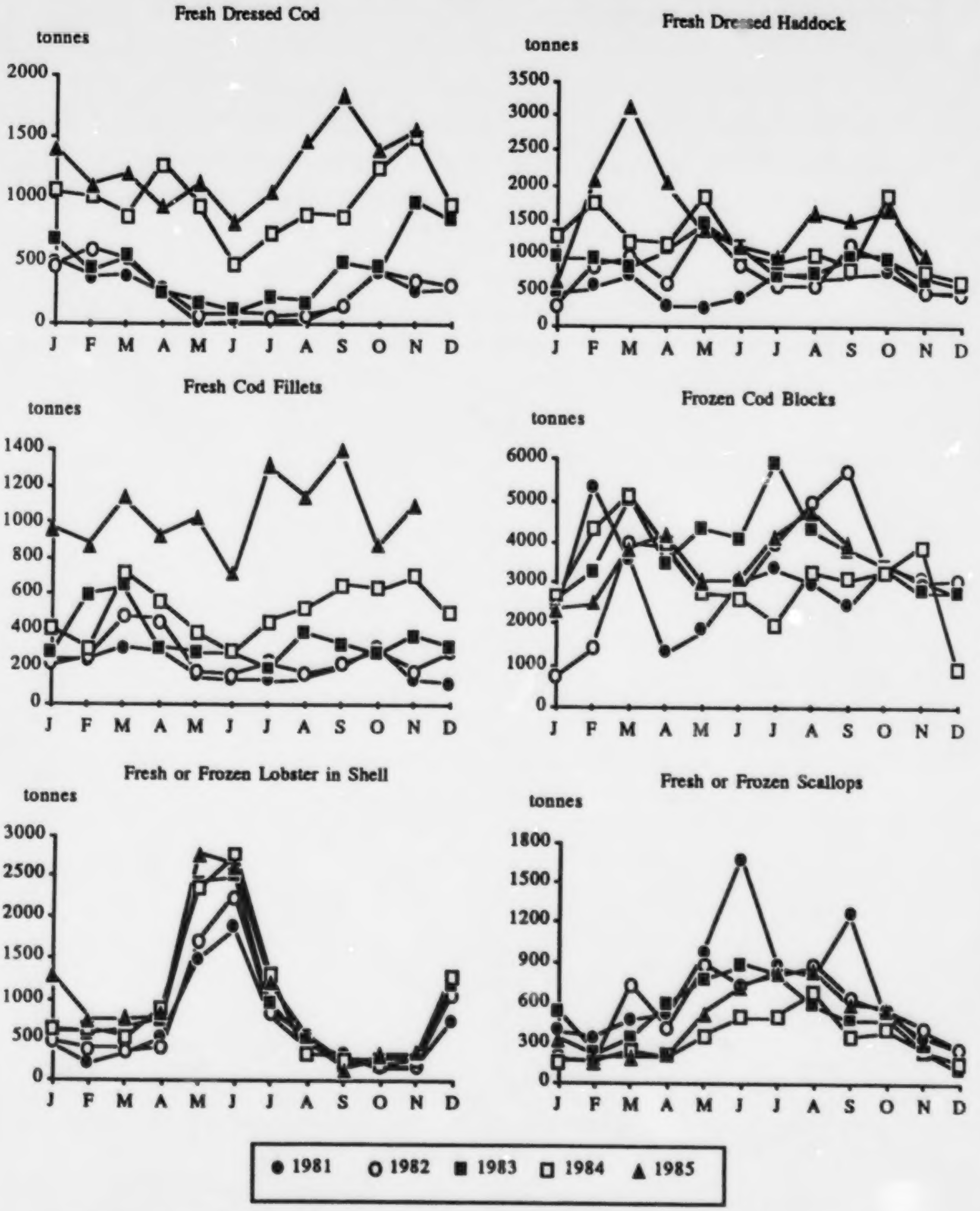
[6] Factors other than U.S. supply and demand have contributed to the increase in production and export of fresh whole fish. Costs of production for frozen fillets and blocks have risen relative to fresh fish production in Canada. This, coupled with depressed U.S. prices for frozen product and the continued depreciation of the Canadian dollar have resulted in higher returns on whole fish.

[7] For a discussion of export trends generally see, R.L. Mazany, *Trade Flows and Market Structure: Atlantic Canada and New England Trade in Fish Products*, 1986.

Figure 3-3: Monthly Exports to the United States by Specie and Product Form, Canada, 1981-1985 (tonnes)



Fresh Dressed Cod

Fresh Dressed Haddock

Fresh Cod Fillets

Frozen Cod Blocks

Fresh or Frozen Lobster in Shell

Fresh or Frozen Scallops

Source: DFO, "Canadian Fisheries Exports".
Prepared by Gardner Pinfold Consulting Economists Ltd

Table 3-2
Canadian Groundfish Exports to the United States, by Product Form,
1979 to 1985 (000's tonnes)

	Fresh		Frozen		Salted/Other*		Total	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%
1979	16.2	10.4	128.9	82.5	11.1	7.1	156.2	100.0
1980	18.1	12.0	122.0	80.6	11.2	7.4	151.3	100.0
1981	23.5	14.2	130.7	78.8	11.6	7.0	165.8	100.0
1982	29.5	16.7	135.8	77.1	10.9	6.2	176.2	100.0
1983	36.9	20.6	132.1	73.7	10.2	5.7	179.2	100.0
1984	55.8	28.8	130.4	67.3	7.7	4.0	193.9	100.0
1985	82.3	39.3	117.5	56.1	9.6	4.6	209.4	100.0

* Includes smoked and dried forms.

Sources: "Canadian Fisheries Annual Statistical Review", 1980, 1981, 1982, 1983.
Statistics Canada, Exports (Merchandise Trade) 1984, 1985
Monthly and Annual (# 65-202 and 65-004) "Domestis Exports by Commodities and Countries".

Prepared by Gardner Pinfold Consulting Economists Limited.

Haddock, Dressed. The seasonal export pattern for haddock is less marked than that for cod because haddock does not lend itself to salting and is shipped either fresh or frozen year-round. With such a substantial proportion of landings exported in fresh form to the U.S. in recent years, to a large degree the export pattern reflects Canadian fishing patterns which in turn are subject to resource constraints and quotas in Canada. To a limited extent it also reflects seasonal harvesting patterns for lobster by Nova Scotia-based inshore vessels. These vessels concentrate on lobster when the season opens at the end of November, switch to haddock and other groundfish in January when lobster prices and landings decline, and then back to lobster in April or May.

Cod, Fresh Fillets. The export pattern has been similar to that for dressed cod and for the same reasons. In general, exports have increased significantly.

Haddock, Fresh Fillets. Monthly exports have been irregular and have declined to relatively insignificant quantities in recent years. It has generally been more profitable to ship haddock in dressed form.

Cod and Haddock Frozen Blocks. Monthly exports of cod blocks over the 1981-1984 period tended to be irregular, with shipments fluctuating between two and five thousand tonnes. Monthly exports were less irregular in 1985, with monthly shipments in the three to four thousand tonne range. The more uniform monthly shipments in 1985 may be explained in part by the reduced seasonality of exports of cod in fresh whole or filleted form and the sharp reduction in salt fish production in 1984. With the increase in fresh fish exports, block production and exports have declined from the levels reached in 1982 and 1983. Haddock blocks are a relatively unimportant product form with irregular monthly shipments. Exports declined from a range of one to five hundred tonnes per month in 1981, to an average of about fifty tonnes in 1985.

Lobster and Scallop, Fresh and Frozen. Month to month variations in exports of lobster tend to be related mainly to supply patterns, and to a lesser extent in response to changes in market demand. High points in lobster exports occur in December, when the season opens in southwest Nova Scotia (and in response to Christmas demand), and in May and June, when the season opens in the other principal grounds in Atlantic Canada. Exports are fairly uniform from January to April, with demand being met from lobster pounds and the fishery in southwest Nova Scotia. From August to November, with the season closed in most areas, demand is met mainly from lobster pounds. Scallop exports vary with supply which in turn is somewhat weather-dependent. Fishing effort and landings are low during the winter months, moderate during spring and autumn, and peak during summer both on Georges Bank and in the Bay of Fundy. Landings and exports declined in the early 1980's due to poor resource conditions and have only in the last year or so begun to recover.

Port Market Prices

Overview

The structure and operation of port markets in Atlantic Canada have been the subject of a number of studies over the years.[8] At a certain level of generality, views about structure are fairly uniform: an industry divided into two sectors, an inshore sector characterized by many independent buyers and sellers, and an offshore sector characterized by a few large vertically integrated companies. Where views diverge is with respect to how distinct the sectors are in a functional sense, and how structural characteristics interact to form prices.

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[8] T. F. Peart, *An Economic Survey of the Canadian Atlantic Groundfish Processing Industry*, DFO, 1977; Marvin Shaffer & Associates, *Structure, Behaviour and Performance of the Atlantic Groundfish Industry with Special Reference to the Quality Enhancement Program* , 1981; Task Force on Atlantic Fisheries, *Navigating Troubled Waters*, 1982; Charles Steinberg, *Structure and Price Determination in Maritime Port Markets: A Study of Fishermen/Buyer Relations*, 1984.

A widely accepted model of behaviour holds that the sectors operate completely independently and that, in the inshore sector, with its relatively low buyer concentration and ease of entry, prices are set competitively in many port markets. The generally lower prices in the offshore sector are attributed to the absence of price competition due to relatively high buyer concentration and the presence of effective barriers to entry.[9]

A second model considers the inshore and offshore sectors distinct in most aspects, but in terms of price formation they are seen as an integrated system characterized by a horizontal structure linking port markets through a network of buyers that is committed to stable seasonal prices governed by strong price leadership from the major integrated processors. The entire inshore fishery is said to constitute the port marke because there is no meaningful price competition in individual port markets. According to this view as well, strong buyer-seller ties are a more significant variable determining price behaviour than buyer concentration.

The analysis in this report suggests the "horizontal integration" model is, on balance, the more accurate description of pricing behaviour in Atlantic Canada. But the analysis also reveals this model to be inaccurate in two key respects. First, the integrated companies do not have the strong price leadership role attributed to them. This is mainly because they have a limited involvement as buyers of fish from inshore fishermen where prices are determined by market transactions. There is price leadership, but it tends to be of a regional nature where the leaders are the larger independent inshore processing companies that are influential in local areas. Accordingly, it would be erroneous to suggest the entire inshore fishery constitutes the port market. Second, meaningful price competition can emerge under certain circumstances, in spite of traditionally strong buyer-seller ties. There is evidence of this in Atlantic Canada, though as yet it is not widespread.

An industry characterized by relatively high buyer concentration *and* strong buyer-seller ties would not be expected to exhibit significant price competition. In practice there is considerable inertia in price setting, both seasonally and annually. Processors interviewed as part of this study emphasized the importance of last year's price as a determinant of this year's price. Individual processors and fishermen do not sit down at the beginning of the season to negotiate prices. They are guided by what was acceptable in the past. Other things equal, the price paid at the end of the previous season tends to be the price offered and accepted at the beginning of the next season. In other words, prices remain unchanged unless there is a good reason for change. A good reason may be a significant change in product prices, or a change in the relative costs of harvesting and processing.

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[9] While this view of the inshore sector has some merit, the same cannot be said of the offshore sector. Offshore prices are not market-determined in any meaningful sense of the term, and therefore buyer concentration is irrelevant. The basis for setting offshore "prices" is discussed in Section 1, above.

While market structure and the industry desire for certainty generate considerable short-term price stability, prices nonetheless vary over time. The strength of the buyer-seller relationship does not relieve the buyer from paying the "going price" for fish in a particular area. But price competition arising from local demand and supply conditions is rare. Market structure ensures that when prices change, they do so in a "controlled" fashion. Control is generally imposed through price leadership, though in some areas informal agreements among processors determine the size and timing of price changes. Buyers are understandably reluctant to deviate from leader-determined or agreed prices since they know any competitors would be forced to follow suit or risk losing supply. In the end such competition would be mutually destructive since it would succeed only in raising the price of fish with no increase in the quantity purchased.

Perhaps the most important conclusion to emerge from our analysis is that while price competition is the exception, meaningful price competition in port markets cannot be ruled out. This conclusion is based on observations of price movements, particularly for haddock, in port markets in southwest Nova Scotia. Among the factors that appear to explain this behaviour are relatively low buyer concentration, proximity to final product markets, an awareness by both buyers and sellers of conditions in final product markets, and local demand and supply conditions.

The discussion of price formation would not be complete without some reference to the relationship between prices and quality. In general, where prices are determined through market transactions, there is no relationship.[10] Almost without exception, the port market structure throughout Atlantic Canada has inhibited the development of pricing behaviour that recognizes and rewards differences in quality. In the words of the Task Force on Atlantic Fisheries,

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[10] A form of quality-based pricing is in effect in the Newfoundland inshore fishery. Under the collective agreement prices vary according to gear type, where the different gear types each produce a more or less uniform quality of fish. Quality differences are also recognized in collective agreement between National Sea Products and its offshore trawlermen.

> One of the most perplexing phenomena in the fishery is that the apparent market preference for high-quality fish fails to be transmitted effectively to fishermen in the form of appropriate price incentives. (p. 258)
>
> The port market can be described as not being "orderly". Its structure, the behaviour of buyers and sellers, and the seasonality and common property nature of the resource inhibit the establishment of appropriate quality-based price differentials at dockside and the timely delivery of the optimum quantity and quality of fish. (p. 267)

There are at least three reasons why a quality-based pricing system has not emerged. First, on a purely practical level, the presence or absence of differentials is a question of the circumstances facing seller and buyer. Provided the premium paid for higher quality fish is enough to cover the fishermen's marginal costs of producing that quality, he stands to gain. And provided the premium is no greater than the marginal gain in net product value, the processor stands to gain. If these conditions do not hold, then the absence of quality-based prices is not at all an indication of irrational behaviour, it is simply a reflection of an assessment by both parties of the costs associated with achieving that quality outweigh the benefits. Included in the costs of sellers and buyers are so called transactions costs associated with the time and expense of actually establishing and maintaining a mutually acceptable grading system. These costs could be formidable, particularly if the industry itself is expected develop a uniform system across wide areas with different resource characteristics and harvesting practices.

Second, if we assume the practical circumstances (including the transactions costs problem) are favourable, as many implicitly do, to answer the question we must look elsewhere: to the factors motivating the behaviour of buyers and sellers within the existing structure of port markets. One of the main factors is the volume orientation of processors. Many processors operate with excess capacity and at low profit margins and cannot risk losing supplies of raw material. This does not mean processors deliberately trade-off quality for quantity, it simply means they find themselves in the position of having to buy all fish at a single price regardless of quality. Consider the circumstances the processor is in. Arguably, many would like to pay more for better fish and less for inferior fish. But any processor who offers a premium for a particular load of fish forces others to offer their boats the same price or risk losing supply. The first buyer is in turn forced to pay all his other boats the higher price now paid by his competitors. The net effect is higher prices with the same quantity and quality. In short, a quality-based pricing system will only emerge if processors are able to pay more for better fish without facing the threat of paying more for *all* fish.[11]

The DFO management and licensing system arguably provides a third reason for the lack of a quality-based pricing system. The global quota within which stocks are allocated in the inshore fishery encouraged competitive fishing. In the long run, this has led to overcapacity in spite of vessel replacement restrictions. In the short run, there is a race for fish to maximize the share of the quota. The gear-specific licensing system removes from fishermen the ability to choose the gear most likely to produce the highest quality fish. The preferred gear would be the one generating the most fish. These factors combined mean the fishermen's incentive and ability to respond to quality-based price differentials, even if offered, are highly constrained.

Inter-Regional and Intra-Regional Price Comparisons

Prices in port markets vary considerably from region to region in Atlantic Canada. There is also considerable variation in price levels within regions and in the timing and frequency of price changes. This variation arises from differences in the characteristics of the fishery, the structural characteristics of the industry, and the institutional arrangements governing price formation. Before examining the relationship between port market prices and prices in final product markets in the U.S., it would be helpful to describe some of the raw price data used in the analysis and explain the basis for similarities and differences in inter-regional and intra-regional price levels and price movement. All price data are for the inshore fishery since inshore prices are determined through transactions between independent buyers and sellers and have at least the potential to be influenced by conditions in final product markets. Cod prices are used for much of the analysis because cod is the main groundfish species caught by inshore fishermen throughout Atlantic Canada. All prices are expressed in terms of round weight.

Inter-Regional Prices

An examination of annual prices shows there are differences in average price levels from region to region, and with minor variation, these differences are maintained from year to year. Using cod as an indicator, Table 3-3 illustrates that among the inshore fisheries,

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[11] **Presumably not all processors are in this position. But the authors are aware of only one exception, a small processor in Souris, Prince Edward Island.**

Table 3-3
Average Cod and Lobster Prices by Region, 1982-1985
($/kg)

	Cod				Lobster			
	1982	1983	1984	1985	1982	1983	1984	1985
Newfoundland								
Inshore	0.36	0.36	0.36	0.36	4.88	4.97	5.61	6.15
Offshore	0.29	0.29	0.30	0.29	-	-	-	-
Scotia Fundy								
Inshore	0.56	0.51	0.48	0.59	5.73	6.20	7.38	7.83
Offshore	0.33	0.33	0.34	0.36	4.55	5.30	5.80	6.85
Gulf								
Inshore	0.38	0.39	0.37	n/a	4.39	4.27	3.97	n/a
Offshore	0.31	0.34	0.27	n/a	-	-	-	n/a
Quebec								
Inshore	0.41	0.39	0.40	0.44	4.59	4.70	4.99	5.34
Offshore	-	-	-	-	-	-	-	-

Note: The prices in this table are lower than the corresponding prices in Table 3-1 for two reasons: first, they are average prices for all fish caught, not prices for a specific size fish as in Table 3-1; and second, they are average prices for all ports in each region, not for selected ports as in Table 3-1.

Source: DFO unpublished data.

Prepared by Gardner Pinfold Consulting Economists Limited.

Newfoundland has prices marginally lower than those in the Gulf and Quebec, while prices in all three regions are substantially lower than those in Scotia-Fundy. In Newfoundland, prices remained unchanged from 1982 to 1985; they fluctuated slightly in the Gulf and Quebec, while in Scotia-Fundy prices declined for three years before rising sharply in 1985.

The general *level* of ex-vessel cod prices in the long-run is explained by several factors including the value of the products made from them, the cost structure of the processing and harvesting sectors, and competitive conditions in the industry.

Newfoundland's consistently lower inshore prices are explained by the need to maintain a uniform set of ex-vessel prices at a level allowing the least profitable processors to remain in operation. Distance from markets, seasonality of operations and a generally lower valued product mix mean many of Newfoundland's inshore plants are only able to pay less than their counterparts elsewhere in Atlantic Canada. That Gulf prices are only marginally higher is because such a high proportion (75 percent) of the Gulf catch is landed by fishermen on Newfoundland's west coast who are covered by the collective agreement. The difference between prices in these regions and those in Quebec, while not great, are probably due to a combination of different competitive conditions, primarily the absence of any institutional need to maintain a single, low province-wide price, and lower production costs facing processors (transportation and utilities, in particular). Apart from these factors, the characteristics of the harvesting and processing sectors are broadly similar -- the same species are harvested, the fisheries are highly seasonal (six to eight months), and processors have roughly the same product mix (mainly frozen and salt cod).

The substantial difference between the prices received by inshore fishermen in Scotia-Fundy and elsewhere on the east coast arises from an apparent capacity of processors to pay more, the recognition of this capacity by fishermen, and the ability of the latter to take advantage of it. At the outset it is important to point out the dominant position of southwest Nova Scotia in the Scotia-Fundy Region. Fishermen operating from ports between Lunenburg and Digby account for two-thirds of the region's inshore groundfish landings.

The capacity to pay more would appear to stem from several factors:

- The resource available to these fishermen tends to be of better overall quality (fish tend to be larger with firmer flesh and generally free of parasites) allowing processors to attain higher yields and produce higher quality products. This means higher product values per unit of raw material weight.

- The species mix is more diversified than elsewhere on the east coast, with a relatively high proportion of valuable species including haddock, halibut, lobster and scallop.
- The fishery is less seasonal, allowing many processors to operate year-round thereby reducing unit costs (Figure 3-4 illustrates how the seasonality of groundfish landings varies from region to region).
- Nova Scotia is close to the U.S. market. Proximity is important because it allows the region's processors to supply the fresh fish market at relatively low cost. Between 1980 and 1985 exports of fresh groundfish to the U.S. from Nova Scotia grew four-fold, accounting for roughly 60-70 percent of exports for most of the period. Table 3-4 shows that while Nova Scotia's exports increased in 1985, its share dropped to about 55 percent as processors in the other provinces began to react to changes in the U.S. market.

Fishermen are aware of all this. This awareness is arguably one of the more important characteristics distinguishing fishermen in Scotia-Fundy from their counterparts elsewhere. They are *sellers* of fish, not just producers; they are generally more aware than other fishermen of what is going on in final product markets. They appear to have been able to combine this knowledge with their proximity to the U.S. fresh fish market to good effect. In other words, the advantage proximity confers on processors has also worked to the advantage of fishermen. For fishermen, the U.S. represents a potential alternative to local processors as a market for their fish. In recent years a number of fishermen have realized this potential by by-passing local buyers and selling directly on the New England market. While the number of so-called "fishermen-packers" engaged in the fresh fish trade is not large and the quantity of fish they ship is relatively small, the mere threat that the practice could become more widespread undoubtedly contributes at least in part to the bargaining strength of fishermen in the area.[12]

While prices in Scotia-Fundy are clearly higher than elsewhere, the real test of bargaining strength is whether fishermen in the region obtain a greater share of final product revenues than fishermen elsewhere. From a province by province comparison of ex-vessel prices for cod and the weighted average unit prices for cod products it appears

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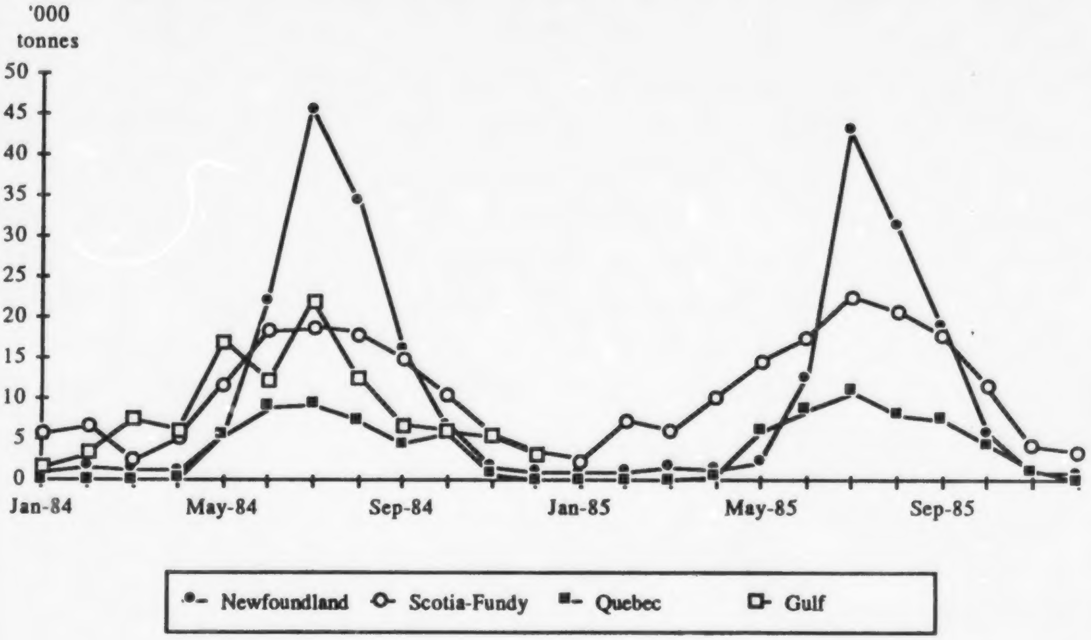
[12] A comprehensive study of customs documents by DFO in 1984 indicated registered fish plants accounted for about 93 percent of whole fresh cod and 94 percent of whole fresh haddock exports in the eleven month period (August, 1983 to June, 1984) covered by the study. The remainder was exported by fishermen packers, brokers, and shippers whose names were not known to the department.

Figure 3-4: Monthly Inshore Groundfish Landings by Region, 1984-1985



Note: Groundfish landings for the Gulf Region are preliminary and only data for 1984 are available.
Source: DFO unpublished landings data
Prepared by Gardner Pinfold Consulting Economists Ltd

they do (see Table 3-5).[13] In 1983, their share was about 22 percent, compared with shares ranging from 14 to 19 percent in the other provinces. It should be emphasized that at best this comparison provides a broad *indication* of relative bargaining strength; it is by no means definitive.[14] To obtain more accurate results would require more accurate product value data. The data used are based on F.O.B. plant value, not on actual selling price.[15] As such, the data are more a reflection of production costs than market value. This does not invalidate the point being made about relative bargaining strength, provided of course, processors in all provinces receive more or less the same market prices. If processors in Nova Scotia receive a higher weighted average market price, the share of revenues accruing to fishermen would possibly be no different than that experienced elsewhere.

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[13] Provincial product data are used because these data are not available at the regional level from published sources. This should not materially affect the outcome since the preponderance of Scotia-Fundy production originates in Nova Scotia.

[14] That caution should be used in interpreting the results of this simple comparison should be evident from an examination of the weighted average product price data in Table 3-5. If prices behaved consistently with the arguments put forward about the alleged better quality of fish available to fishermen in Nova Scotia and the implications this carries for product quality, then we would expect this to be reflected in higher prices for Nova Scotia products. Instead, the weighted average unit value was lower than that of Newfoundland and Quebec and more or less equal to that of New Brunswick. This reinforces the point in the text that the product data are more representative of production costs than selling price.

[15] For plants shipping large quantities of frozen blocks to their converter plants in the U.S., product values, F.OB. plant, may be further understated because internal transfer prices would be used.

Table 3-4
Fresh Groundfish Exports to the United States, Nova Scotia and Canada
1979 to 1985, (000's tonnes)

	Whole			Filletted			Total		
	Canada	Nova Scotia		Canada	Nova Scotia		Canada	Nova Scotia	
	tonnes	tonnes	%		tonnes	%		tonnes	%
1979	10.2	5.7	55.9	6.0	3.9	65.0	16.2	9.6	59.3
1980	12.3	7.5	61.0	5.8	3.8	65.6	18.1	11.3	62.4
1981	15.9	12.1	76.1	7.6	4.6	60.5	23.5	16.7	71.1
1982	21.2	13.3	62.7	8.3	4.6	55.4	29.5	18.0	61.0
1983	25.3	17.1	67.6	11.6	6.8	58.6	36.9	23.9	64.8
1984	39.9	26.4	66.2	15.9	8.3	52.2	55.8	34.8	62.4
1985	56.0	32.6	58.2	26.3	12.4	47.2	82.3	45.0	54.7

Source: Canadian Fisheries Annual Statistical Review, 1980, 1981, 1982, 1983.
"Exports by Main Countries of Destination"
and Statistics Canada, Exports (Merchandise Trades), 1984, 1985.
Monthly and Annual (# 65-202 and 65-004)
"Domestic Exports by Commodities and Countries".

Prepared by Gardner Pinfold Consulting Economists Limited.

Table 3-5
Landed Prices as a Percentage of Unit Product Values,
by Province, 1983

	Landed (L)(1)	Product (P)(2)	L/P
	$/kg		%
Nova Scotia	0.51	2.37	22
New Brunswick	0.39	2.09	19
Prince Edward Island	0.39	2.36	17
Quebec	0.39	2.68	15
Newfoundland	0.36	2.49	14

Notes: 1. Landed prices are expressed in round weight. See Table 3-3.

2. Unit product values are a weighted average of all cod products.

Source: DFO, Annual Statistical Review.

Just as competitive conditions and final product values help to explain regional differences in price *levels*, they also help to explain differences in price *movement*. Establishing prices through collective agreement accounts for the absence of movement in Newfoundland and the insignificant change in the Gulf. Cod prices received by inshore fishermen in Scotia-Fundy and Quebec showed some movement, declining from 1982 to 1984, and then rising in 1985 (Table 3-3). These changes were a response to weakening conditions in the U.S. market for frozen products (particularly cod blocks) in 1983-84, and the recovery in 1985. Some of this price movement may also be explained by the growing importance of fresh fish production in response to favourable conditions in the U.S. market. The changes indicate port markets are at least somewhat responsive to conditions in final product markets.

Intra-Regional Prices

Newfoundland

Under the 1984/1985 collective agreement for the inshore fisheries, the province is divided into three areas, with a uniform set of prices for each species established for each area. These prices vary by fish size (three categories), method of capture (i.e., baited hook, otter trawl, trap, gill net and jigger) and quality (two categories). For the main species, cod, the combination of these factors results in a set of 18 prices varying from a high of $0.540/kg to a low of $0.044/kg. For all other species the set consists of only two to three different prices. In practice, while prices vary from species to species, with the exception of cod, they do not vary from area to area. For cod, the area difference is one cent per kg (for fish over 45.7 cm). The price schedule for cod is presented in Table 3-6.

A review of average weekly prices in the Newfoundland Region shows considerable variation in some ports and very little in others. It is important to emphasize that any variation is less attributable to differences in market structure or changes in market conditions, than to differences in the characteristics of the catch and the prices associated with those characteristics (i.e., size, gear and quality). For example, according to the price schedule in Table 3-6, one would expect ports with landings of large cod caught by baited hook to have higher prices than ports with landing of smaller fish caught with trap or gill net. Ports along the south coast would be expected to have less seasonal variation in prices than ports along the northeast coast; the former are ice-free and fishermen operate year-round, while the latter are ice-bound during winter and early spring, allowing only seasonal operations including the summer trap fishery.

Table 3-6
Newfoundland Inshore Cod Prices,(1) 1984-1985

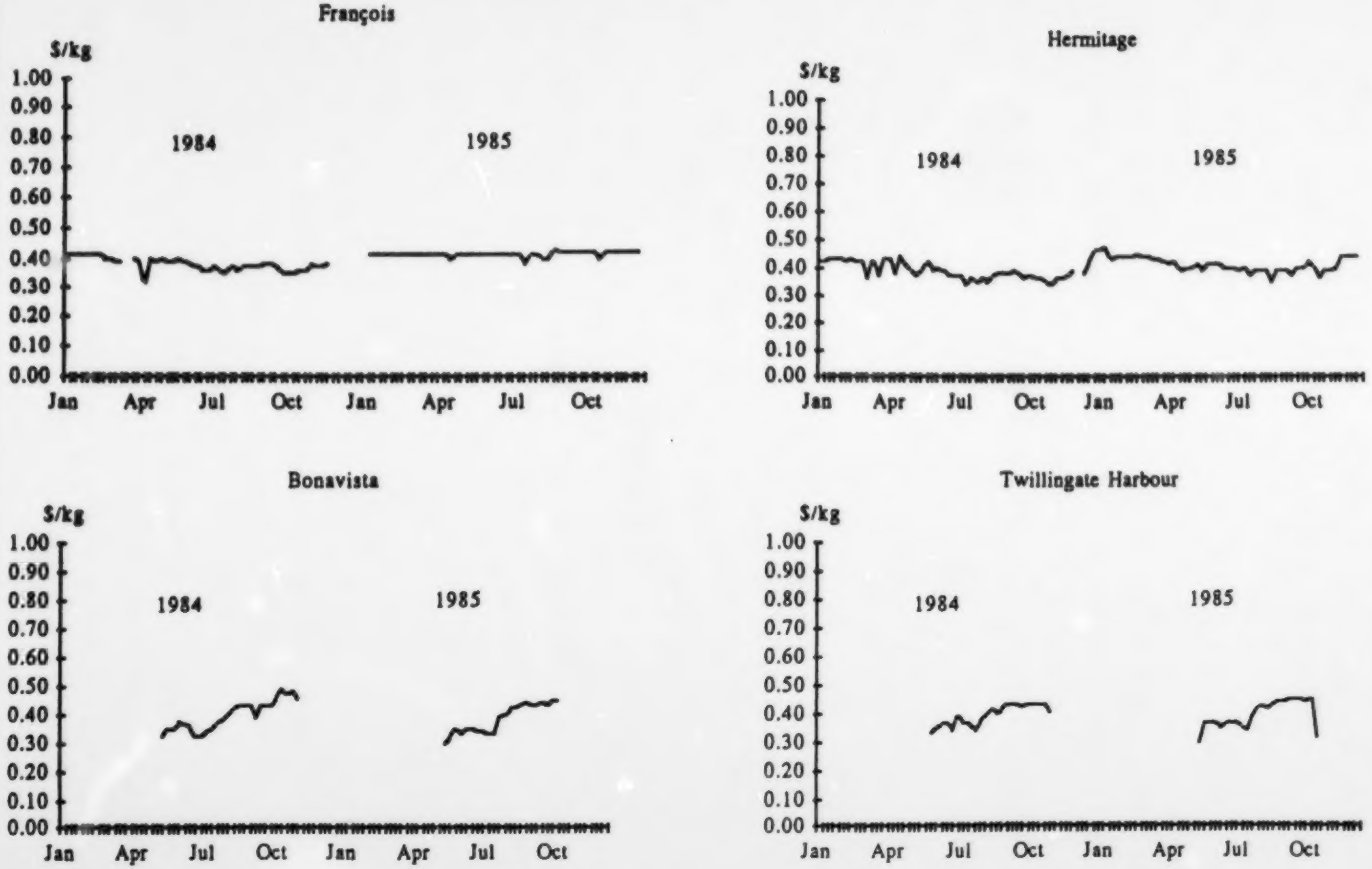
Gear Type	Fish Size	Grade "A"	Grade "B"
		$/kg	
Baited Hook	- over 61 cm	0.5291	0.2866
	- 46-61 cm	0.4409	0.2205
	- 41 - 46 cm	0.2645	0.0441
Otter Trawl	- over 61 cm	0.4740	0.2866
	- 46-61 cm	0.4078	0.2205
	- 41-46 cm	0.2315	0.0441
Trap, Gillnet and Jigger	- over 61 cm	0.4409	0.2866
	- 46-61 cm	0.3803	0.2205
	- 41-46 cm	0.2205	0.0441

Note: 1. The prices apply to cod gutted head-on only.

Source: Collective Agreement between the Fisheries Association of Newfoundland and Labrador and the United Food and Commercial Workers, Local 1252, effective June 1, 1984 - May 31, 1985. Appendix "A".

The price data shown in Figure 3-5 support these expectations. For example, in the small community of Francois on Newfoundland's south coast, fishermen operate virtually year-round from vessels under 13.7 m using predominantly gillnets and handlines. During 1984 and 1985, prices remained relatively steady at about $0.40/kg. In Hermitage, a larger south coast port with more variation in vessel size and gear type, prices were generally higher and more variable. These prices are in sharp contrast with those paid in Bonavista and Twillingate. In these and other ports along the northeast coast, the fishery is highly seasonal (six to eight months) and prices reflect the strong influence of the trap fishery which tends to produce a glut of smaller, lower quality fish during June and July.

Figure 3-5: Weekly Inshore Cod Prices, Newfoundland Region, 1984-1985



Source: DFO unpublished data
Prepared by Gardner Pinfold Consulting Economists Ltd

The prices specified in the collective agreement are minimum prices. There is nothing in the agreement to prevent buyers from paying more if market conditions require; indeed, the agreement makes explicit reference to this possibility. For the reasons given in the overview, buyers are understandably reluctant to deviate from the specified prices since they know any competitors in the area would be forced to follow suit. Processors are understandably reluctant to risk setting off this series of events. A form of competition for supply that is not uncommon, though, involves the less than rigorous adherence to the relationship between specified prices and the corresponding characteristics of the fish ordinarily necessary to attract a particular price. For example, to secure supply a processor may pay the specified price for large cod for cod that is actually only of medium size. Understandably, the union discourages this and other similar practices that undermine the authority of the collective agreement.

Scotia-Fundy

There are considerable differences in price behaviour and resulting price levels within the Scotia-Fundy Region. In contrast with Newfoundland, these differences are attributable mainly to differences in competitive conditions arising from the structure of the industry and, to a lesser extent, to differences in the characteristics of the fishery. In many respects, the price behaviour in northeast Nova Scotia has more in common with ports in the southern Gulf and Quebec, than with ports in southwest Nova Scotia. Indeed, southwest Nova Scotia has a few key structural characteristics that set its competitive environment apart from all other areas.

Before examining the data, it is important to point out the prices shown are average prices for *all* fish, not average prices for a particular size of fish. In many ports prices vary by size, (higher prices for larger fish), so week-to-week differences in the composition of the catch by size of fish will result in variation in average prices. In certain ports the difference in cod prices between scrod (the smallest size) and steak (the largest size) could vary by as much as $0.40/kg. Unfortunately, the method used to compile and process price data makes it impossible to retrieve prices for a particular fish size and consequently it is not always possible to isolate the influence of changes in market conditions from changes in the size composition of landings. This is the case for week-to-week fluctuations; long-term trends can be recognized.

At the risk of oversimplification, prices tend to be higher and exhibit greater variability in southwest Nova Scotia than in other parts of the region. Evidence of this is provided by the examples shown in Figure 3-6, Port Morien and Yarmouth, and also those shown in Figure 3-7. Prices are generally higher in southwest Nova Scotia for the reasons discussed earlier: differences in resource characteristics, proximity to the U.S. market and the higher net value of final products, and the market orientation of fishermen. There is also evidence that differences in market structure, specifically lower buyer concentration resulting in price competition, may play a role.

The greater week-to-week variability in the Yarmouth prices is difficult to explain by anything other than differences in fish size; but the payment of different prices according to size is not unrelated to market structure and the competitive environment. In many of the smaller ports in the region, the custom is to pay a single price for fish of a given species regardless of size; a system of pricing according to size has not evolved in the absence of sufficiently competitive conditions. Port Morien, in northeast Nova Scotia, is a small, relatively isolated port with a single buyer. Yarmouth is one of a number of relatively large inshore ports, each with several buyers, concentrated at the extreme southwestern end of Nova Scotia. In 1985, seventeen buyers were active in the port, with the largest accounting for less than 30 percent of purchases. This relatively low buyer concentration is typical of ports in the area.[16]

According to the horizontal integration model of price behaviour, one of the dominant characteristics of the inshore fishery in Atlantic Canada is the absence of day-to-day price competition for supplies of raw material. From the perspective of price, the term "market" is a misnomer. Transactions take place, but the fish landed is not available to all buyers as it would be in the classic market setting. Processors secure supplies and maintain their "market share" through the system of mutual dependence (amounting to quasi-vertical integration) described in Chapter Two. The ties between buyers and sellers are stable. (The evidence for this is strong: data gathered in the course of this study shows only in the range of 5-8 percent of vessels in the Scotia-Fundy study ports sold to more than one buyer during 1984-85.)[17] Though ties are stable, processors must nonetheless pay the going price for fish. But prices are established, not through competition, but through leadership or by informal agreement.

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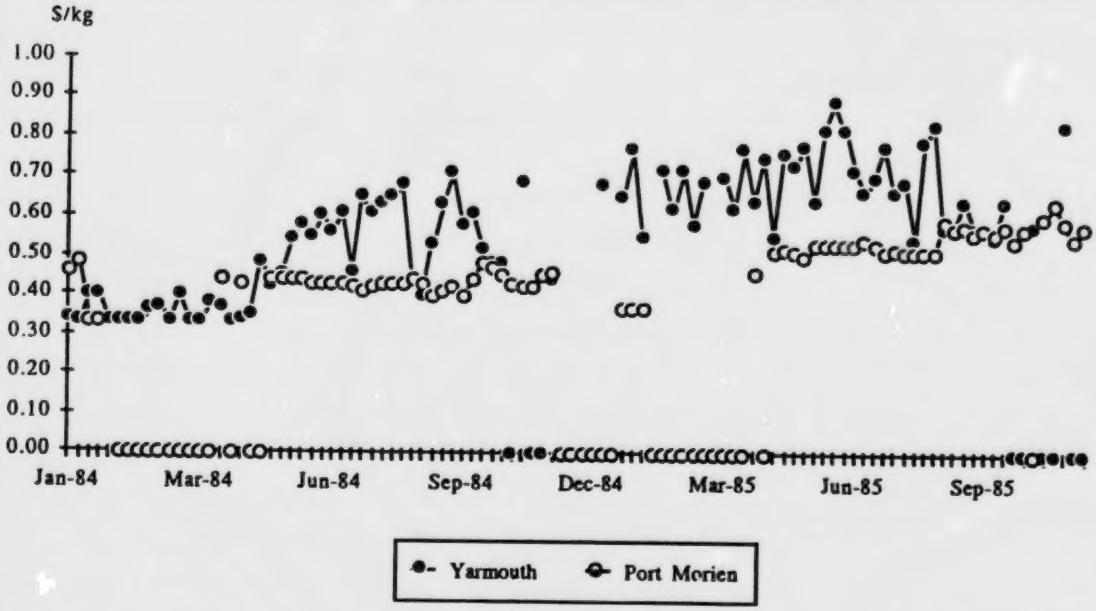
[16] See Chapter Two, Table 2-8.

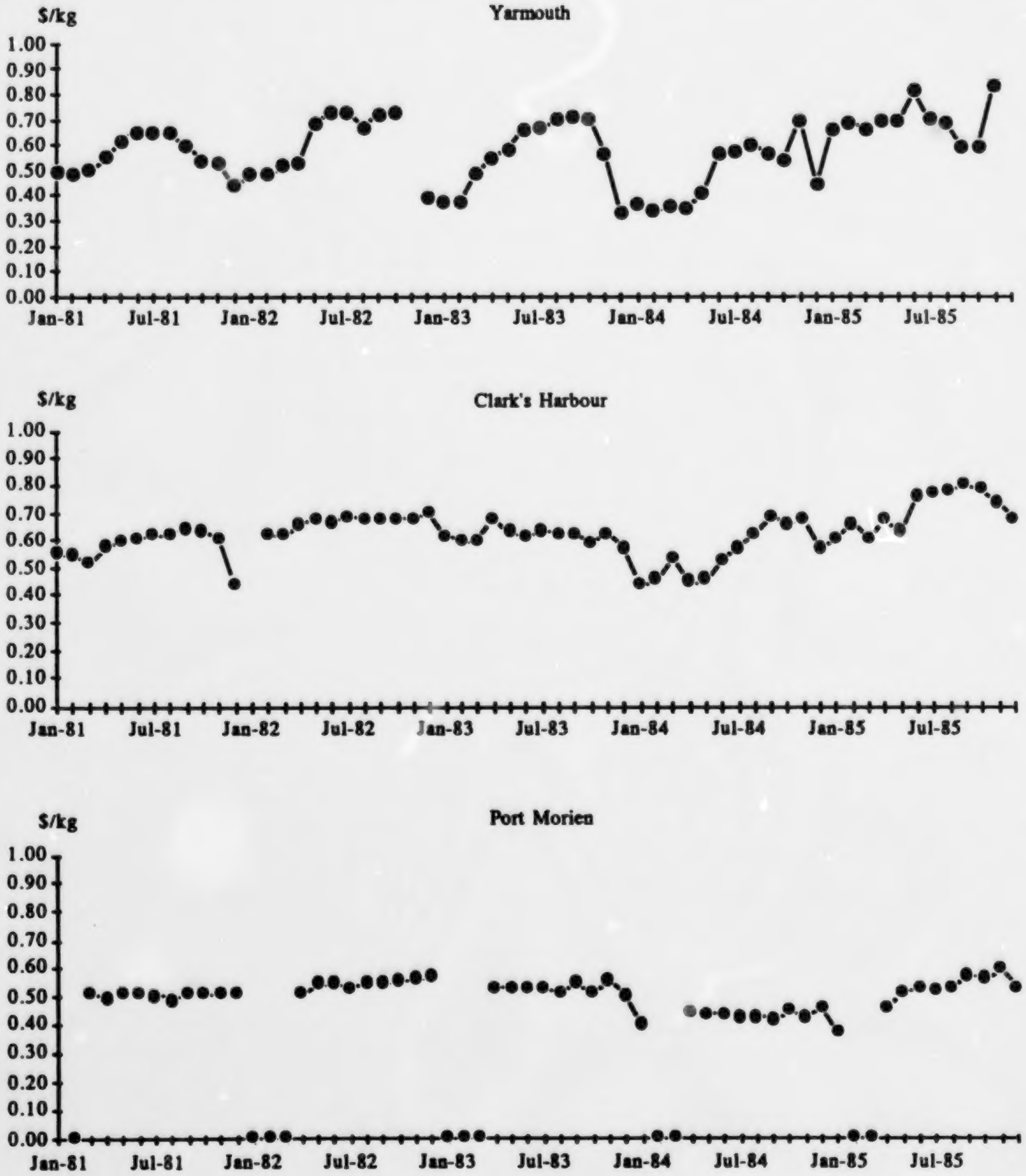
[17] See Chapter Two, Table 2-23.

Figure 3-6: Inshore Cod Prices in Yarmouth and Port Morien, Scotia-Fundy, 1984-1985



Source: DFO unpublished data
Prepared by Gardner Pinfold Consulting Economists Ltd

Figure 3-7: Monthly Average Inshore Cod Prices, Selected Ports, Scotia-Fundy Region, 1981-1985



Yarmouth

Clark's Harbour

Port Morien

Figure 3-7: Cont'd

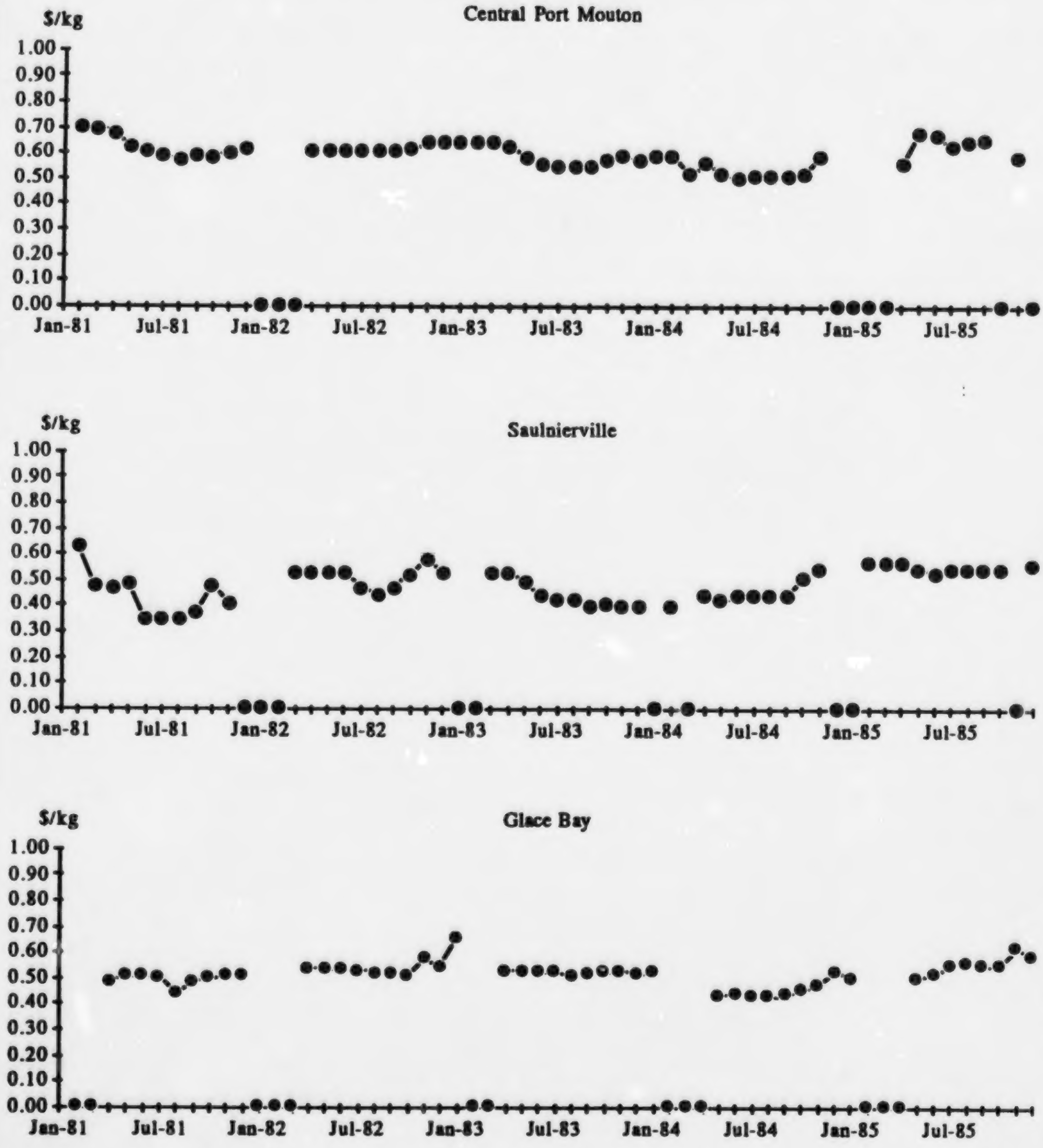
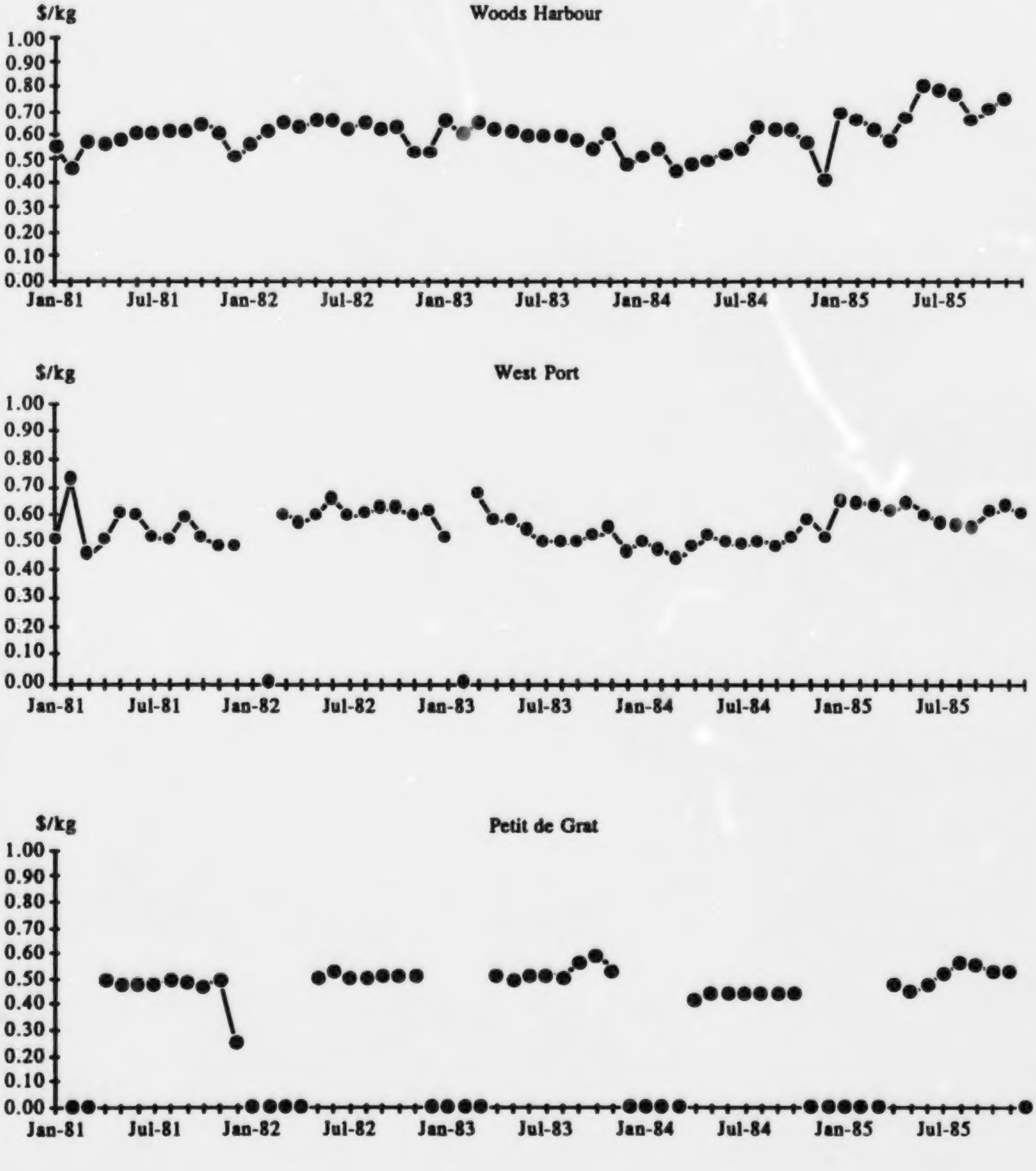


Figure 3-7: Cont'd



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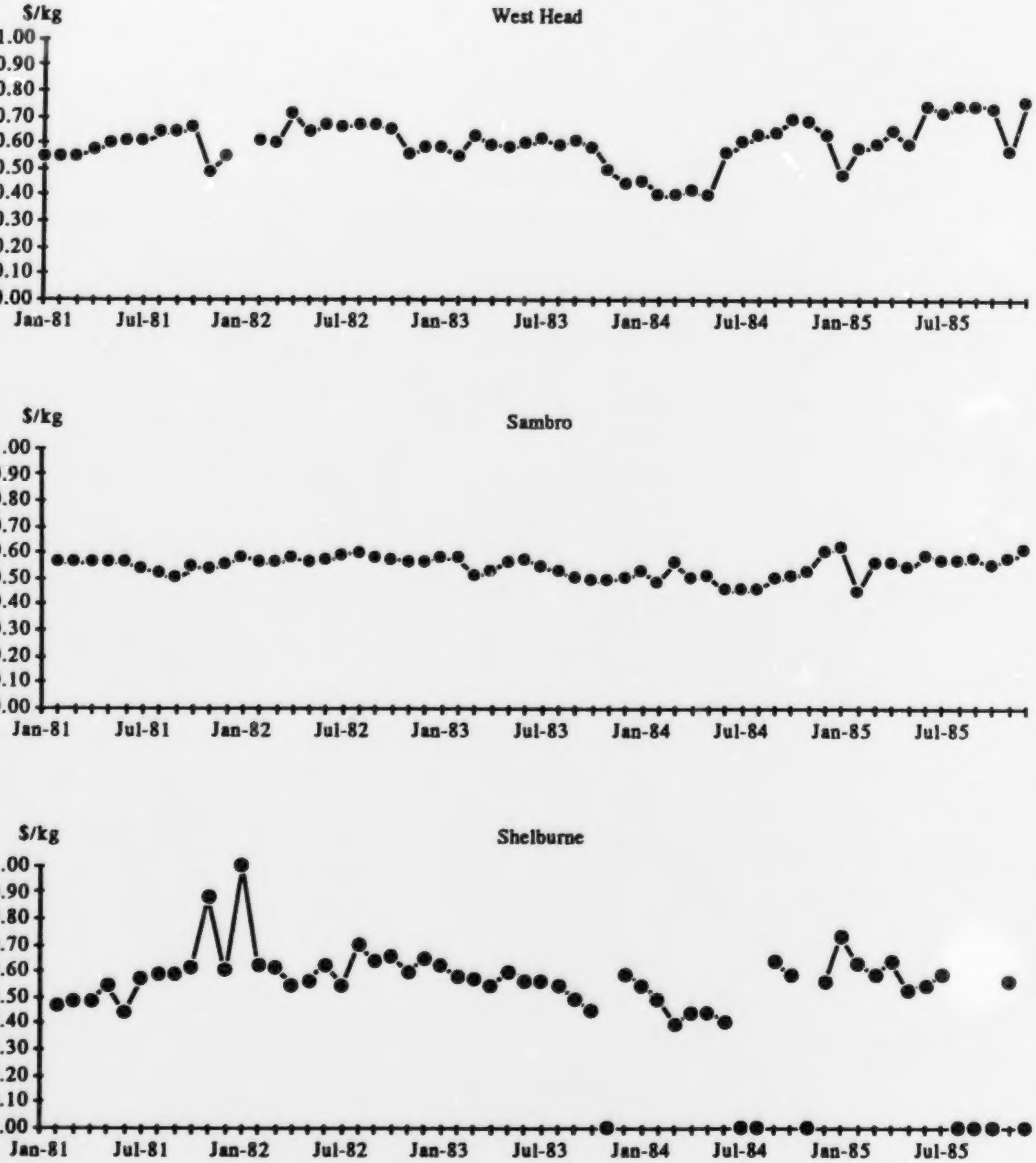


Source: DFO unpublished data
Prepared by Gardner Pinfold Consulting Economists Ltd

To assess how well the horizontal integration model of price behaviour explains price formation in port markets, average monthly inshore prices for cod for the period 1981-1985 are examined, together with monthly buying patterns of processors and other buyers for 1985. Average monthly instead of weekly prices are used in order to isolate actual price changes from changes due to differences in the size composition of landings. The analysis is carried out using data from twelve Scotia-Fundy ports, nine from southwest and three from northeast Nova Scotia. Seasonality of landings is a characteristic of all ports. Ports in southwest Nova Scotia have landings year-round, though relatively few vessels operate in winter and landings are relatively low compared with summer. By contrast vessels in ports in northeast Nova Scotia generally cease operations in late fall and winter. From the perspective of market structure, the ports fall into one of two categories: those where the number of buyers varies directly with seasonal changes in the quantity of landings, and those where the number of buyers is stable year-round irrespective of the pattern of landings. The price data are shown in Figure 3-7 and the buyer data in Table 3-7.

Since 1981, the general movement of cod prices in Scotia-Fundy may be summarized as follows:

- The southwest Nova Scotia ports all exhibit some degree of seasonal price variation. This ranges from substantial in the case of Yarmouth, to minimal in the case of Central Port Mouton. Prices in northeast ports (Glace Bay, Port Morien and Petit de Grat) tend to be fairly stable.
- What is striking about the seasonal variation is that in most ports prices vary *directly* with quantity landed, not inversely as might ordinarily be expected. The exceptions are Central Port Mouton and Sambro where price variation, though slight, is inversely related to quantity.
- Though there have been differing degrees of seasonal variation, average annual prices changed relatively little (there was a slight decline) between 1981 and mid-1984. Since mid-1984, prices in southwest ports have been increasing steadily, with continued seasonal variation.
- Prices began to increase in the northeast in mid-1985, but the increases have not been as great as in the southwest.

Competition appears to have played a more significant role in shaping these patterns of price movement than the model would have predicted. Consider, for example, the seasonal pattern of high summer and low winter prices observed in several ports. There appear to be two related factors at work, final product prices in the U.S. and other export

Table 3-7
Monthly Number of Buyers(1) for Groundfish, 1985

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Glace Bay	1	0	0	1	4	4	6	4	5	5	4	3
Port Morien	1	0	0	1	1	2	1	1	1	1	1	1
Petit de Grat	1	1	1	2	2	3	2	4	3	2	2	1
Sambro	7	4	7	5	4	3	5	5	4	4	5	4
Shelburne	13	17	12	19	13	9	7	5	5	7	7	4
Clark's Harbour	2	2	2	3	7	6	7	5	5	7	4	4
West Head	4	8	6	7	9	7	6	10	6	5	4	4
Woods Harbour	4	8	6	7	9	6	5	7	5	6	6	3
Yarmouth	4	3	3	6	10	9	9	6	6	5	2	1
Saulnierville	1	1	1	1	2	1	2	1	1	1	1	1
West Port	1	1	2	2	1	2	1	1	1	1	1	1
Central Port Mouton	1	1	2	2	1	1	1	1	2	1	1	1

(1) Supplementary B sales not included.

Source: DFO, unpublished transaction data.

Prepared by Gardner Pinfold Consulting Economists Limited.

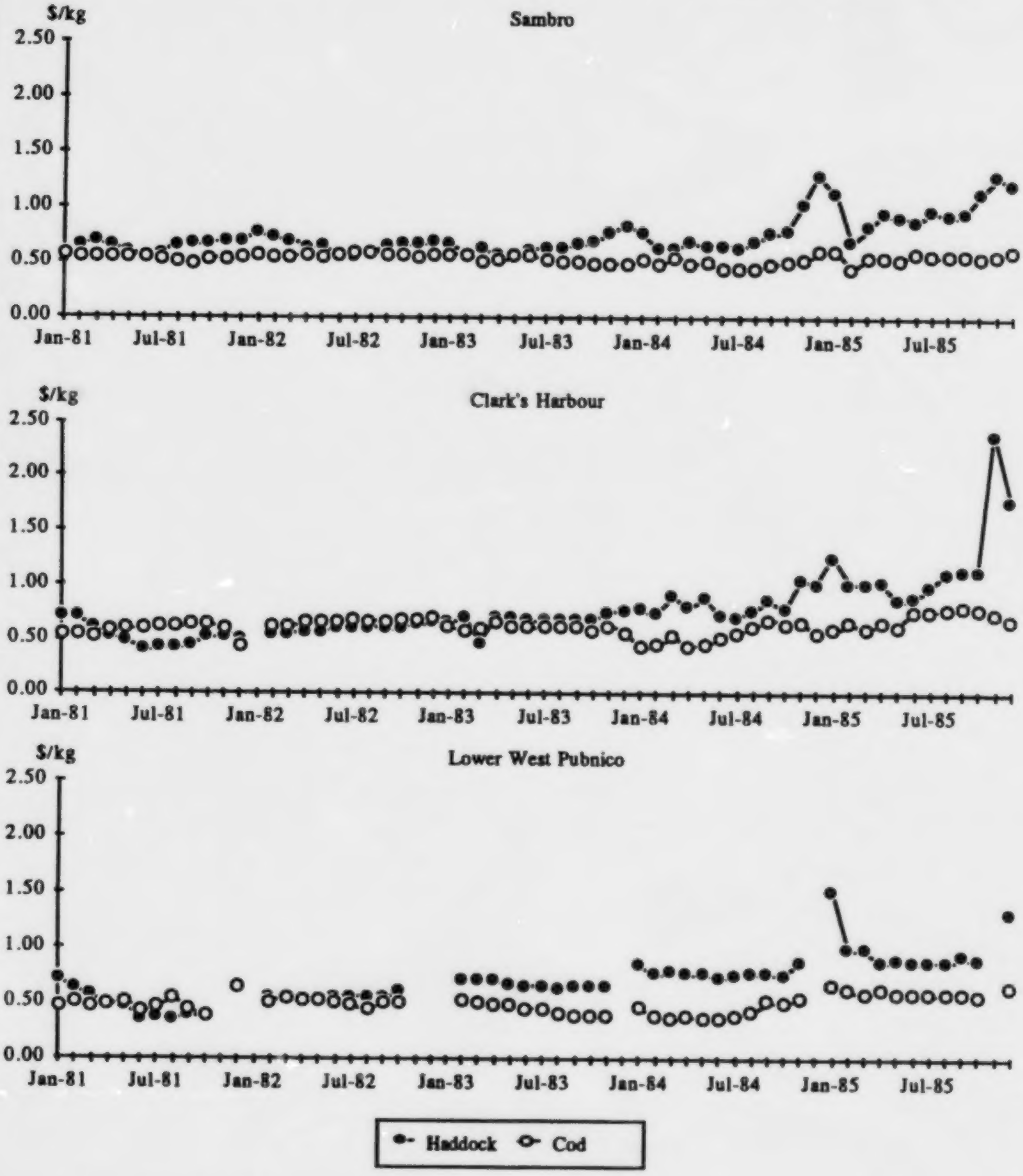
markets, and local demand and supply. Processors in southwest Nova Scotia process cod into two main product forms, salted and fresh (dressed and filleted). Salt cod is produced mainly in summer when, due to supply and demand conditions in the U.S., fresh fish prices there are relatively low (relative, that is, to salt cod), and fresh fish is produced in winter when fresh prices are relatively high. By switching products, some stability is maintained in the value of final products.

If prices for final products were the only determining factor of port market prices, the latter would be expected to be more or less stable year-round, or possibly greater in winter in response to high U.S. fresh fish prices. The seasonal pattern actually observed is inconsistent with this expectation. Seasonal variations in local demand and supply offer a plausible explanation for this apparent anomaly. The data in Table 3-7 provide considerable support for this hypothesis. In Yarmouth, Clark's Harbour, West Head and Wood's Harbour, not only does supply vary with the seasons, so does demand. It increases during the spring and summer months as seasonal processors and other buyers become active. In other words, though supply is growing, demand is growing more rapidly. It seems difficult to avoid the conclusion that there is competition among buyers for available supplies resulting in upward pressure on prices.

It is interesting to contrast these prices with those for haddock. Haddock prices have traditionally been somewhat higher than cod, though since 1983, with declining Canadian and U.S. catches and generally high demand, the divergence has grown considerably. Port market prices for haddock also show seasonal variation, but unlike cod, in most ports they rise in winter and fall in summer. A comparison of average monthly cod and haddock prices in three ports in southwest Nova Scotia are shown in Figure 3-8. To illustrate there is an exception to virtually every "rule" in the fishery, prices in Lower West Pubnico are included in Figure 3-8. They have followed the generally rising trend in prices, but in a remarkably controlled fashion with virtually no seasonal variation whatsoever.

Haddock prices are also subject to competitive behaviour, but the factors affecting prices are somewhat different resulting in a difference in the direction of seasonal movement. In recent years haddock has been exported to the U.S. mainly in fresh whole form. Less is exported in filleted form, either fresh or frozen. Moreover, haddock does not lend itself to salting, so there is less is scope for shifting to other product forms in response to changes in market prices as there is with cod. This means less seasonal

Figure 3-8: Monthly Cod and Haddock Prices, Scotia-Fundy, 1981-1985



Source: DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

variation in demand than there is with cod and an apparently stronger influence from the U.S. price which, like that for cod, rises in winter and falls in summer.

The model would predict price stability based largely on the strength of buyer-seller ties and effective price leadership. But the situation in many ports in southwest Nova Scotia may not be one to which the model applies. When there are many buyers in an area, (a departure from the classic oligopsony structure), it is bound to be more difficult to control prices through leadership or informal agreement, particularly if some of the buyers are outsiders. It is all the more difficult if buyers are facing inadequate supplies of raw material, a problem not unusual in southwest Nova Scotia. Finally, while buyer-seller ties are generally stable, an important condition in the model, they are not absolutely binding and buyers must pay the going price or risk losing supply. The data in Table 2-23, introduced earlier, show not only that fishermen do shop around, but their apparently competitive behaviour increases somewhat in the summer months. While the number of fishermen who sell to more than one buyer is relatively small, perhaps it is sufficient for just a few to engage in this behaviour to cause buyers to bid up their prices.

Prices behave very much as the model would predict in ports where the number of buyers is relatively stable year-round. Among these are Port Morien, Petit de Grat, Sambro, Saulnierville, West Port and Central Port Mouton. Though landings are seasonal, these ports exhibit little, if any, seasonal variation in price. For all but Sambro, this should not be too surprising since each is relatively isolated, has only from one to three buyers, and in each case the largest buyer accounts for over 90 percent of purchases (see Table 2-8). Sambro has more buyers (four or five for most of the year) and a much lower concentration (in 1985, the largest buyer accounted for about 30 percent of purchases).

Perhaps the most striking aspect of the observed price behaviour is the sustained rise in prices (with some seasonal variation) in the southwest ports since 1984. This appears to have been a watershed year. Lying behind the trend are market conditions in the U.S., and more specifically, in New England. New England groundfish landings have declined substantially in the face of a rising demand for fresh products (whole fish and fillets) causing prices to increase significantly. Processors and buyers in Atlantic Canada have responded to this situation by shifting production increasingly away from traditional salt and frozen products to fresh fish. The shift has been most pronounced in Nova Scotia, and particularly in the southwest ports, where processors and buyers have the advantage of proximity, so important in responding to the requirements of the fresh market. The trends in exports to the U.S. from Nova Scotia are shown in Table 3-8. In 1984 and 1985 fresh fish accounted for *about 55 percent* of the total, up from just over 40 percent in 1983.

Table 3-8
Nova Scotia Groundfish Exports, Total and Fresh, All Destinations
and to the U.S., 1979 to 1985

	All Destinations			United States		
	Total	Fresh	Fresh as %	Total	Fresh	Fresh as %
	tonnes		of Total	tonnes		of Total
1979	60.2	9.7	16.1	50.1	9.6	19.2
1980	73.8	11.4	15.4	56.2	11.3	20.1
1981	89.1	16.8	18.9	60.7	16.7	27.3
1982	96.9	19.1	19.7	64.0	18.0	28.1
1983	97.6	24.2	24.8	68.5	23.9	34.9
1984	104.4	35.2	33.7	74.6	34.8	46.6
1985	111.4	45.5	40.8	82.8	45.0	54.3

Note: 1) Includes all fresh, frozen and salt/dry products.

Source: Canadian Fisheries Annual Statistical Review, 1980, 1981, 1982, 1983.
"Exports by Main Countries of Destination"
and Statistics Canada, Exports (Merchandise Trades), 1984, 1985.
Monthly and Annual (# 65-202 and 65-004)
"Domestic Exports by Commodities and Countries".

Prepared by Gardner Pinfold Consulting Economists Limited.

The shift to fresh fish production is all the more remarkable when considered in the context of total Nova Scotia exports to all destinations. The data in Table 3-8 show *41 percent of groundfish exports (by product weight) from Nova Scotia left the province in fresh form in 1985*. This shift might be regarded as staggering considering the proportion was just 19 percent in 1982.

The effect of this transition on price behaviour in ports in southwest Nova Scotia is evident from Figure 3-7. Simply stated, processors and buyers are competing for supply (with each other and to a limited degree with fishermen-packers) and driving up ex-vessel prices. This does not imply a breakdown in the established order of buyer-seller ties, but it provides evidence to support the argument that, when dictated by market forces, price competition will emerge. Perhaps prices are not as high as they might be in the absence of these ties, and perhaps they would be higher if buyer concentration were even lower and buyers were not attempting to limit prices through leadership or informal agreement; but observed price movement clearly indicates at least some competitive pricing behaviour in port markets in response to longer term trends in final product markets.

The nature and extent of the response is influenced by the level of competition for supplies and also by the increasing awareness of market conditions on the part of fishermen. Information on conditions in the New England fresh fish market is readily available by telephone. But more than anything else, the nature and extent of the response is influenced by the form in which the product leaves the processing plant. In recent years, between 70 and 75 percent of fresh exports have been in dressed form (see Table 3-4). *Whole dressed cod and haddock acquire little additional value simply by virtue of having passed through the hands of a processor.* Fishermen know this, and have been demonstrably successful in exploiting the new competitive environment and securing a greater share of the final product value. In effect, fishermen have moved a step closer to the final market for their product. At the same time, processors have to a certain extent abandoned their traditional role as manufacturers and have assumed what might best be characterized as a brokering/shipping function. Judging from the data (Figure 3-7) and on the basis of interviews with processors, the effects of this shift in market conditions are beginning to be felt in ports in the northeastern part of the region as buyers go further afield to secure supply.

Gulf Region

In general, pricing behaviour in the Gulf Region conforms very closely to the horizontal integration model. Most ports have no more than two or three buyers, with the largest usually accounting for over 90 percent of purchases. Judging from the transactions data introduced in Chapter Two, buyer-seller ties tend to be stronger in the Gulf than any of the other regions. With the exception of a few ports along the south coast of Newfoundland, the Gulf fishery is highly seasonal, lasting at best from April to October. Owing to this relatively short season and to traditional pricing practices, there is little seasonal price variation in most ports. As in other regions, differences in price level from port to port are attributable mainly to such factors as value of final products and distance from markets.

Prices for six representative Gulf ports are shown in Figure 3-9. Tignish Run and Lameque are typical of relatively isolated ports where a single buyer accounts for virtually

Figure 3-9: Weekly Inshore Cod Prices, Gulf Region, 1984-1985

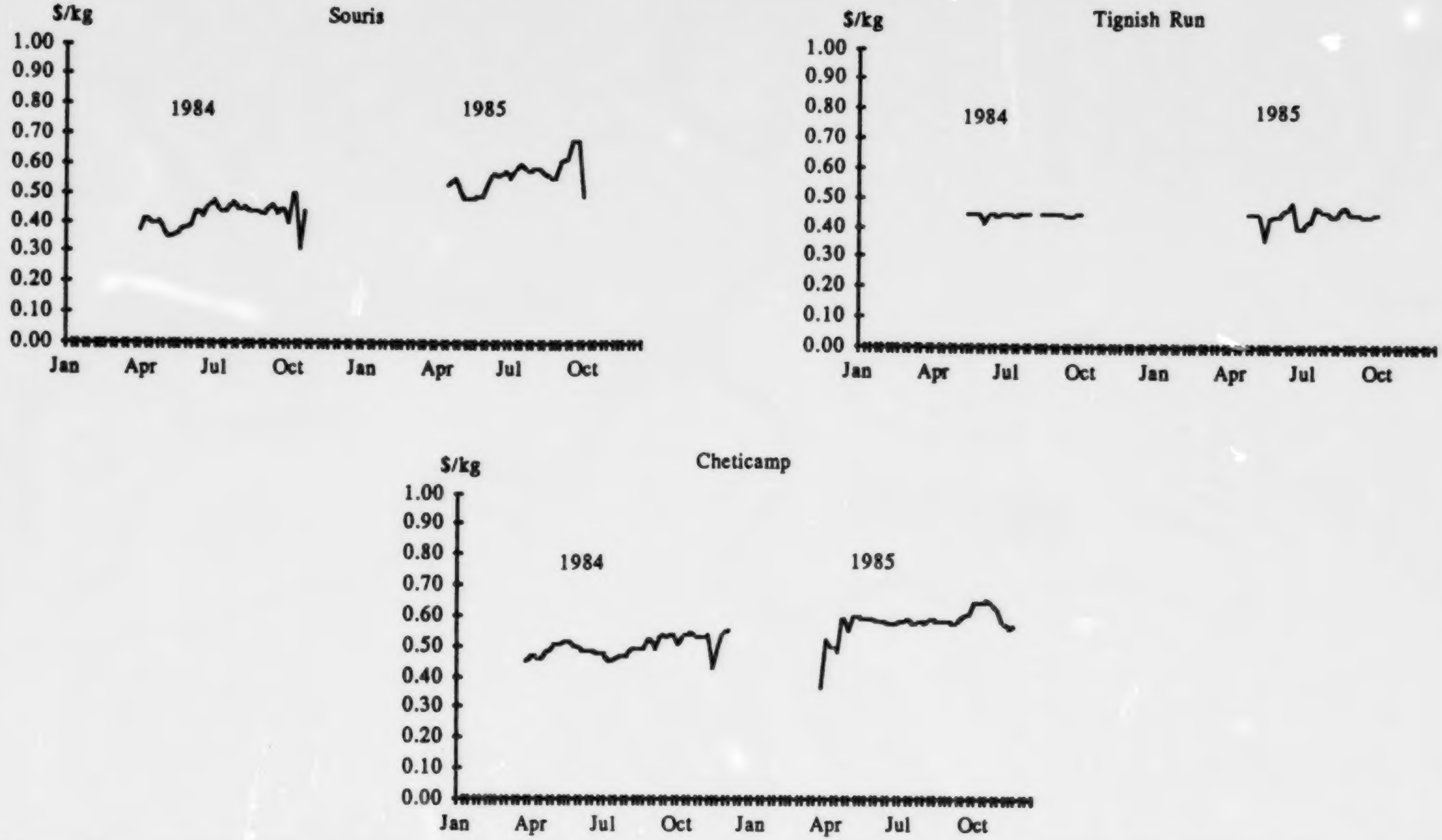
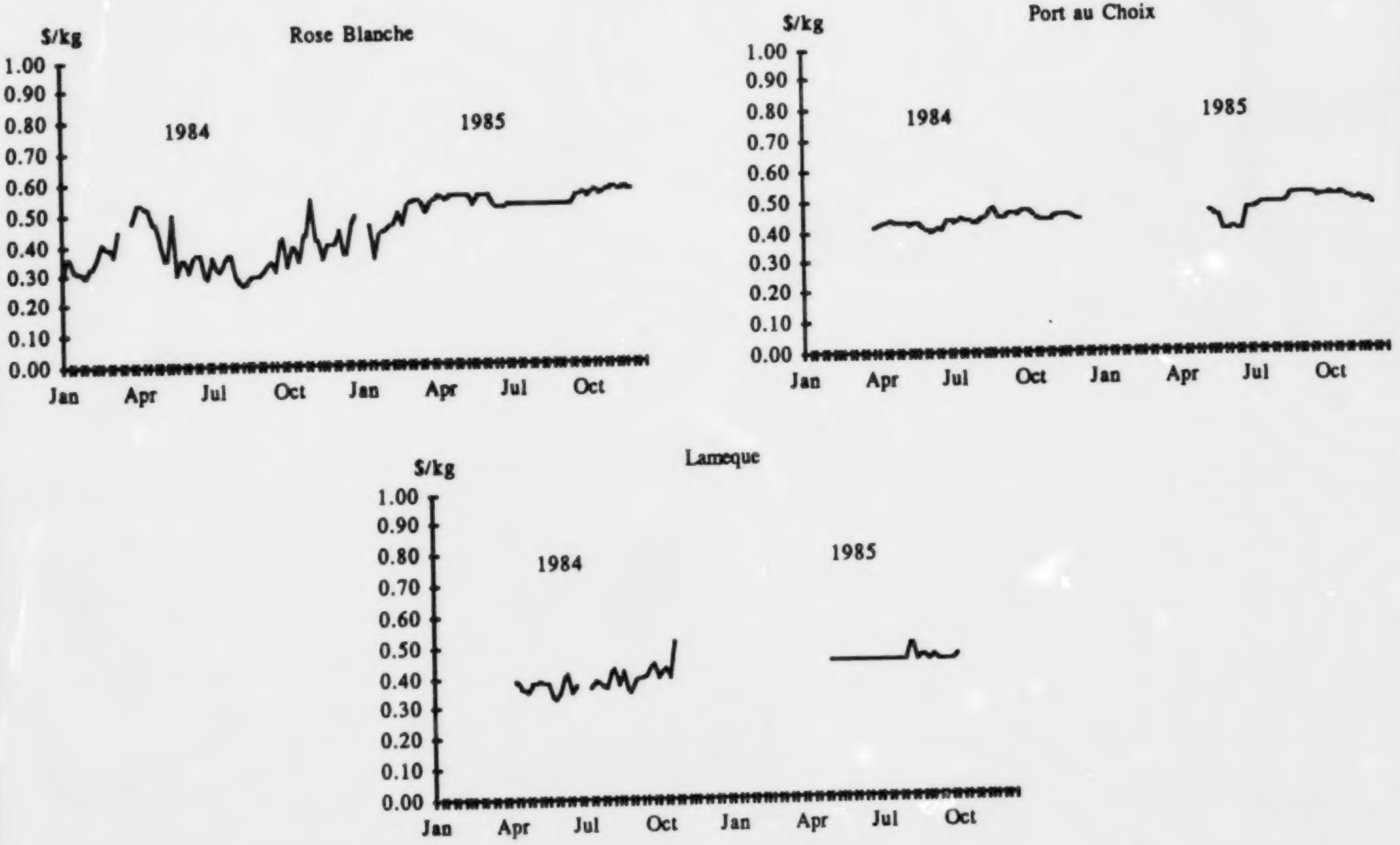


Figure 3-9: Cont'd



Source: DFO Unpublished Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

all fish sold. Prices are relatively low with little or no seasonal variation, and tend to be fairly stable from year to year. In ports with generally higher landings and more buyers, such as Cheticamp and Souris, inshore prices also show little seasonal variation, but appear to be more sensitive to changes in final product markets. The return to favourable product market conditions in 1985 after a year or so of depressed prices was reflected in an improvement in landed prices in both ports.

Prices in Rose Blanche and Port au Choix, like other Newfoundland ports in the Gulf Region and most other ports in the province, are subject to the collective agreement covering inshore fishermen. Price levels and price movement may not be materially different from those elsewhere in the Gulf, but pricing behaviour within the framework of collective bargaining, of course, is.

Quebec Region

The Quebec Region is divided into three statistical districts: Gaspesie, Cote-Nord and Iles de la Madeleine. Prices vary somewhat from district to district due mainly to differences in industry structure, distance from markets and the value of final products. Though there are differences in price levels from district to district (and to a degree within districts), once prices are set they tend to remain fairly stable (if they move at all) throughout the relatively short six to seven month fishing season. This stability reflects industry structure on the Iles de la Madeleine and along the Cote-Nord, but in Gaspesie it is attributable mainly to the traditional practices and the strong buyer-seller ties that exist. Inshore prices in representative ports from each district are shown in Figure 3-10. (As in the other regions, apparent week-to-week average price variability is related to fish size, not to changes in market conditions.)

Prices are highest in Gaspesie, the most important district in terms of the number of fish plants and vessels, and the quantity and value of landings. These ports are closest to the product markets in central Canada and the U.S. In 1984 and 1985, prices were highest in Cloridorme and Rivière au Renard, ports in close proximity and each with several buyers. The lowest prices were found in Ruisseau-Chapados, a small port with a single buyer. The differences may be related to differences in buyer concentration, but there does not appear to be any consistency in the relationship across ports in the district. Beyond these examples, there is no pattern. For example, Anse a Beaufils had but one buyer and reported prices among the highest in the district; Grande Rivière, with several buyers,

Figure 3-10: Weekly Inshore Cod Prices, Quebec Region, 1984-1985

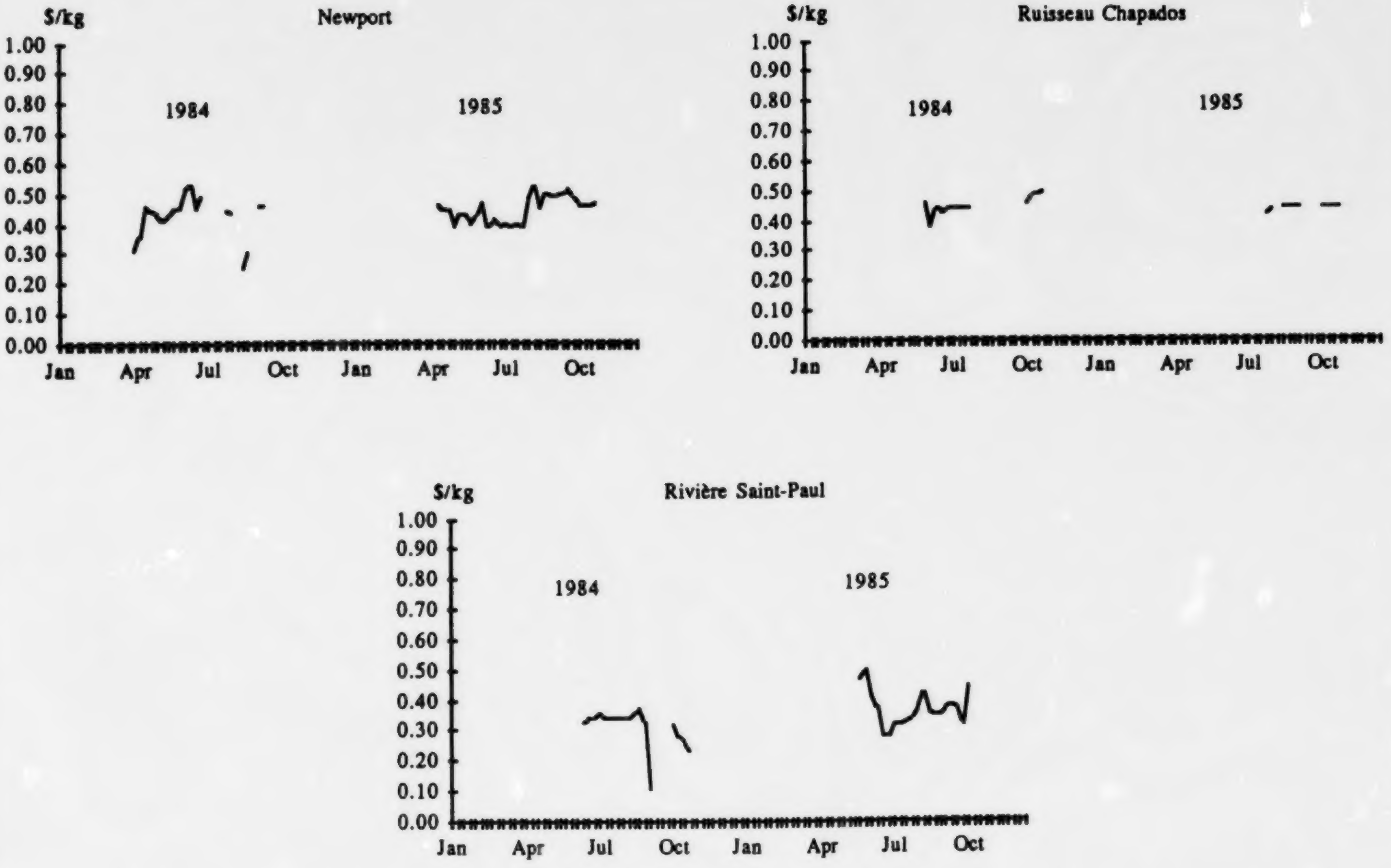
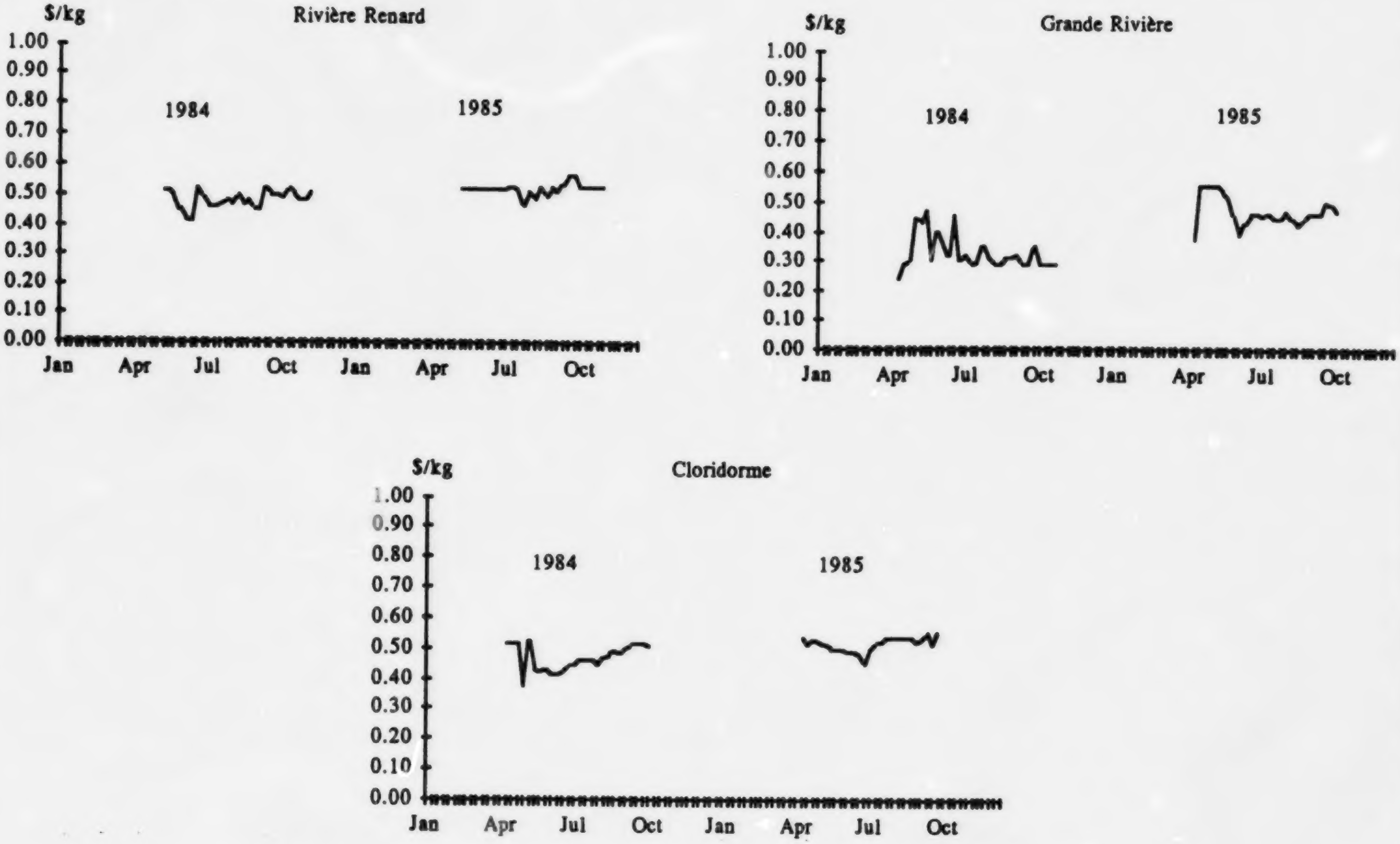


Figure 3-10: Cont'd



Source: DFO unpublished data
Prepared by Gardner Pinfold Consulting Economists Ltd

reported among the lowest prices. Though there are differences, they are slight, and it is likely they have more to do with differences in average fish size than with competition. Indeed, the uniformity of prices across the district is more satisfactorily explained in terms of buyer-seller ties and price leadership resulting from the oligopsonistic industry structure.

The lowest prices are found in Cap-aux-Meules on Iles de la Madeleine. This is attributable mainly to the relative isolation of the islands, but also to the offshore orientation of the local processing company. It is a vertically integrated company interested almost exclusively in redfish. Prices in ports along the Cote-Nord fall roughly midway between those in the other two districts. These prices are as high as they are because most of the fish along this coast is bought by the Canadian Saltfish Corporation. All fish is bought at set prices established at the beginning of the season. These prices are the same as those the Corporation pays in Newfoundland.

3. Summary and Conclusions

A detailed analysis of price movements in one hundred port markets in Atlantic Canada reveals considerable annual and seasonal price stability. In Newfoundland, this stability is explained by the non-market nature of transactions. But even in ports in the rest of Atlantic Canada where fish is bought and sold subject to market transactions, prices exhibit considerable stability. In an industry characterized by high buyer concentration and strong buyer-seller ties this should not be too surprising. Buyer-seller ties are particularly important in minimizing the degree of price competition, and thereby reducing the economic significance of so-called market transactions. Market structure ensures that when prices change they do so in a controlled fashion with regional or local area control imposed either through price leadership by the larger inshore processors, or through informal agreements among a number of processors. The vertically integrated companies, once believed to play a major price leadership role, appear now to have little, if any, influence on market-determined inshore prices in most areas.

While price competition is the exception, meaningful price competition in port markets cannot be ruled out. The pattern of seasonal and annual price movements in ports in southwest Nova Scotia provide strong evidence of price competition. The evidence is strongest in the case of haddock. Among the factors that appear to explain price behaviour in these ports are relatively low buyer concentration, local demand and supply conditions, proximity to final product markets, and a keen awareness by both processors and fishermen of conditions in final product markets. High prices for fresh fish in the U.S. market appear to have been particularly important in inducing competitive behaviour.

CHAPTER FOUR

PORT MARKET EFFECTIVENESS AND ALTERNATIVE METHODS FOR PRICE FORMATION

1. Port Market Effectiveness

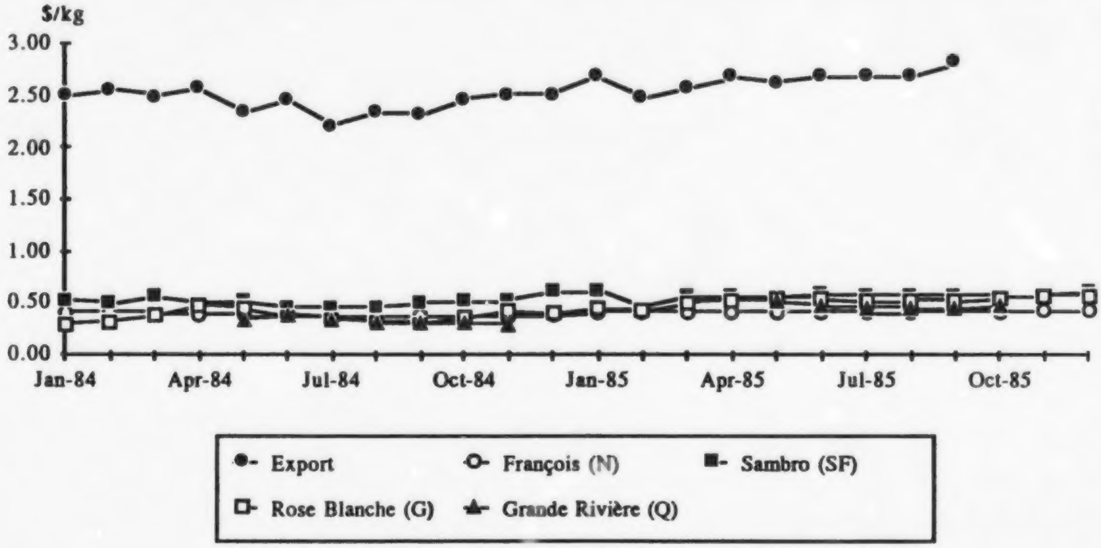
Overview

In this chapter the effectiveness of the port market pricing mechanism is examined. The pricing mechanism is judged to be effective if it transmits information regarding changes in consumer demand expressed in wholesale and retail markets correctly and quickly to fishermen via appropriate price changes. Auctions as a method of price formation are also assessed, and observations made about the merits of establishing them in ports in Atlantic Canada.

The question of port market effectiveness is addressed by estimating the strength of the relationship between prices in the U.S. market and in port markets in Atlantic Canada. The null hypothesis to be tested is that a positive relationship should exist given the predominant position of the U.S. as a market for Canadian fish products. For each port analyzed, the null hypothesis is tested by estimating simple correlation coefficients between the Wednesday price established on the Boston auction and the weekly average price in selected Canadian port markets. Specifically, the hypothesis tested is whether the correlation coefficients are statistically greater than zero (i.e., there is a positive association between U.S. wholesale and Atlantic Canada port market prices). The Boston blue sheet is used as a source for U.S. price data. The weekly Canadian port price data were prepared by the statistical branches in the regions specially for this study. For Scotia-Fundy, the data cover a three-year period, 1983-1985. For the other regions, the data cover two years, 1984-1985.

Estimating the correlation between U.S. frozen product prices and port market prices is ruled out on the basis of a preliminary analysis of product prices. Due to the nature of the product and the markets served, prices vary only slightly from month to month. Prices in most port markets also vary only slightly from month to month. Price stability is attributed to market structure and buyer-seller ties. Under the circumstances, obtaining a statistically significant correlation between variables that effectively do not vary would not be all that meaningful. In other words, if we wish to test for responsiveness to change, we must begin with change. The relationship between landed prices for cod in selected ports in Atlantic Canada and the price for cod blocks exported to the U.S. is illustrated in Figure 4-1.

Figure 4-1 : Monthly Export Prices for Cod Blocks and Landed Prices for Inshore Cod, Selected Ports, 1984-1985



Source: DFO Unpublished Landings Data
DFO. "Canadian Fisheries Export".
Prepared by Gardner Pinfold Consulting Economists Ltd.

The Boston Auction

Auctionning fish to determine an ex-vessel price for the various species is a long standing practice in Boston. The Boston auction, more formally known as the New England Fish Exchange, was established early in the 20th century. That it continues to have the influence it has may be surprising since only about 20 vessels now operate from the port. Much of the New England groundfish fleet is now based in Gloucester, one of the main processing centres.

Gaining the right to buy and sell through the exchange is relatively easy. Anybody can sell there, as long as the fish is at or on the dock. Most of the fish sold arrives on boats at the pier, but trucked or over-the-road fish can be, but rarely is, sold through the exchange. On any given day no more than six or seven vessels would be in port for the auction. Unlike the European fish auctions where fish is displayed prior to its sale, fish in Boston is sold sight unseen.

All fish for sale is listed on the auction board and is identified by species and by vessel. Buyers can buy all or part of the fish on a particular vessel. The large central pier in Boston facilitates this arrangement since the buyers have equal access to all vessels unloading fish. In Boston, a bid on a species sets the price for that species on all boats. Once the price is established by the highest bidder, other buyers may agree to take some of that species on other boats, though sometimes the catches are auctioned separately.

To buy fish, a buyer must first establish a line of credit equal to two days expected purchases through the exchange. Once the catch is bought, the boat is usually unloaded and paid within an hour, and the buyer must pay the exchange by the following morning. The exchange deducts a 1.5 percent fee from the value of all fish sold. Both wholesalers and retailers can buy fish at the exchange, but the latter rarely do. Bidding rights cost $150 per person, plus an additional $750 for any buyers who are not actually located on the pier.

The auction itself takes place in a small office area located in an old building at the end of the pier. Bidding begins at 7:00 a.m., about an hour after most buyers arrive on the pier. Early arrival is essential to find out the quantity and species of fish available. All fish at the pier, whether in boats or trucks, is supposed to be listed on the auction board. In recent years, over-the-road fish has been sold in private side deals rather than through the exchange. Some of the fish listed on the auction may not actually be for sale. Known as 'bagged fish', this is sold privately and withheld from the auction. Bagged fish gets the same price as auctionned fish, and by withholding it, the price of the remaining fish is supposed to be driven up by buyers anxious to fulfill their commitments to their customers.

These private sales are sometimes linked with relationships that develop between buyers and boats. A buyer may agree to 'handle' a boat. In effect, he becomes the agent for the vessel, arranges the direct sales and agrees to see to it that all of the boat's fish are sold, even if he must buy them himself. Sometimes the vessel-buyer reltationship will lead the buyer to bid up the price of particular species in order to confer extra benefits on 'his' vessel.

Handling boats is also advantageous for the buyers. The fishing captain becomes familiar with the quality of fish preferred by the buyer and is more apt to deliver it. In some cases, the buyer will get the 'top of the trip', that is, the last fish caught. This is, of course, simply another way of ensuring the buyer gets the top quality fish. Since most of the wholesalers on the pier deal in fresh fish, quality is an important consideration.

Handling a vessel is not limited to a single vessel-single buyer relationship. For instance, one of the larger buyers operating on the Boston auction handles eight vessels. The extent of the vessel-buyer relationships is not well documented. In addition to the various services provided, some observers speculate that 'handling' vessels may extend to some buyers having a financial interest in some vessels. The overall effect of these arrangements affects the bidding process, and the resulting price is unclear.

The Boston auction operates on the assumption that all fish is top quality. During the unloading, the buyer may contest this assumption. A neutral party (or sometimes a committee of three) arbitrates the dispute. If the fish is determined to be less than first quality, an arrangement is struck involving a lower price (sometimes called the 'second price') or some other deal which effectively lowers the price. Failing this, the fish can be resold back in the auction room. Experienced observers guess that about five percent of the fish is resold this way, mostly in the summer.

When interest rates were high in 1982, the practice of listing over-the-road fish on the exchange became more common than in the previous decade. This seems to be related to the same day or next day payment for fish sold through the exchange, as opposed to perhaps a 30-day waiting period for payment on transactions outside the exchange. The listing of over-the-road fish has declined in the past year. Although over-the-road fish comes from the Cape Cod area, northern New England and Canada, on the day the consultant visited the auction, only one truck was present with fish from New Hampshire. This fish was not listed on the board, but nevertheless, the whole truck load was sold to one buyer in a private sale, negotiated while the auction was in progress.

Many stories are told about peculiar events affecting the prices set on the Boston market on a given day. Sometimes, it is alleged, a buyer will make a deal to purchase a load of fish in New Bedford or elsewhere, but keep this information secret. The same buyer then bids up the price of the same species on the Boston auction knowing that he has a sure profit locked in. Another circumstance sometimes cited is the spillover of personal animosities arising from previous business relationships into the auction process. For example, one buyer who previously worked for a second buyer will intentionally bid up the price for a particular species solely to prevent his rival from acquiring fish needed to serve a valued client.

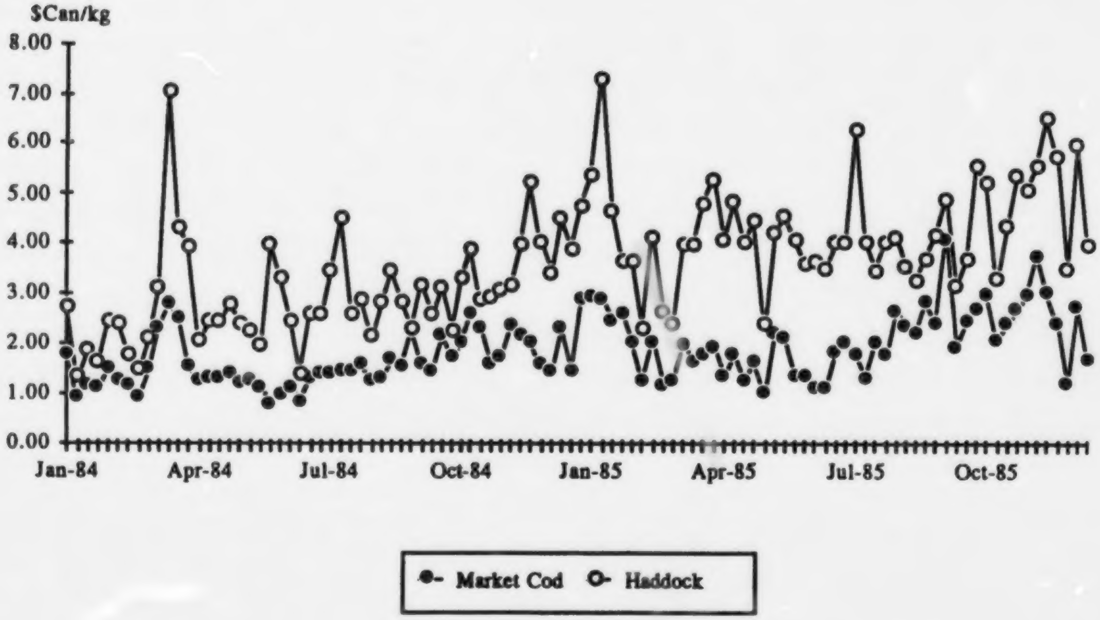
The fish prices set on the Boston auction (and also on the New Bedford and in recent months the Portland auction) form an important element of the information on the New England fisheries market contained in the 'Blue Sheets', the market news service of the U.S. National Marine Fisheries Service. The 'Blue Sheet' prices are often used as reference indicators for the 'true' value of fish by both American and Canadian fishermen and fish processors. As one might conclude from the previous description of the workings of the Boston auction, the quality of the information provided by the Boston prices varies widely from day to day. The question is, what is the value of information provided by the Boston auction and other 'Blue Sheet ' prices?

A review of daily Boston cod and haddock prices shows that wide daily price swings can occur, independent of any secular trend or seasonal factors. To illustrate this point the Wednesday auction prices for market cod and haddock for 1984 and 1985 are shown in Figure 4-2. Prices are expressed in Canadian dollars converted at the exchange rate on the day in question. Haddock prices are consistently higher than cod, though the difference in price levels tends to vary from week to week. While prices for both species move in the same direction in the short-run, price fluctuations of haddock tend to be greater and in general haddock prices exhibit a more consistently rising long-term trend.

The day-to-day swings could be associated with unusually small quantities of fish on the auction or the other circumstances cited above. But whatever the circumstances under which they are established, the auction prices are clearly based on only a very small proportion of the total quantity of fish in the New England fisheries market. These features undermine the value of the Boston prices as indicators of the overall state of the market. They also provide good reasons to believe the day-to-day price fluctuations will not and should not be reflected in the prices formed in Atlantic Canada port markets.

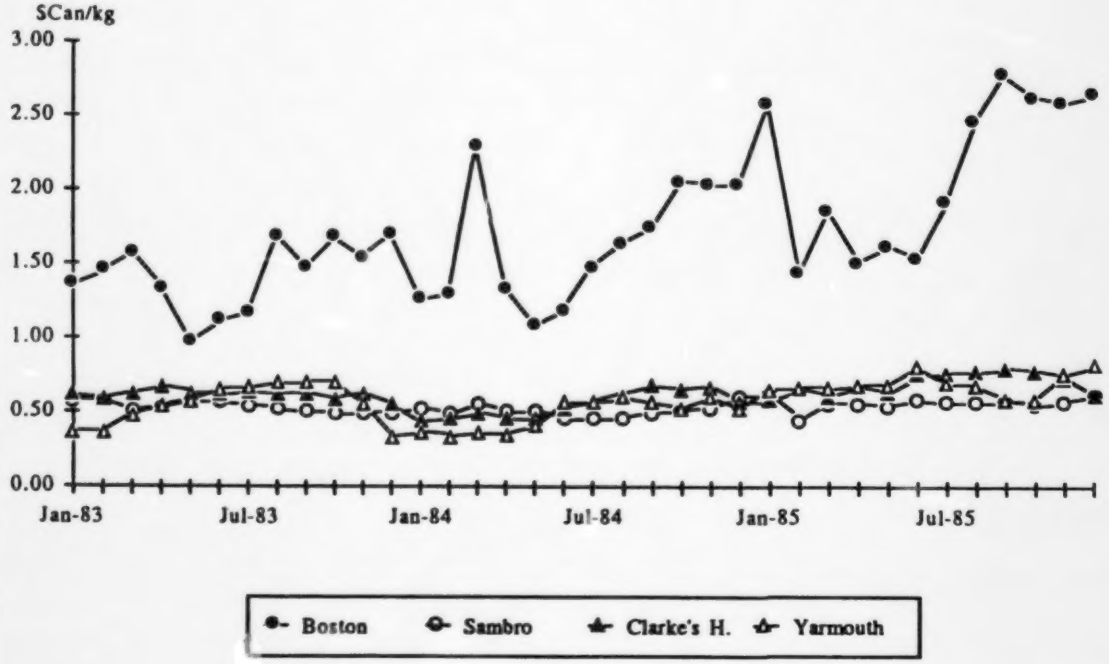
With the wide day-to-day fluctuations and the generally rising prices over the period, it is difficult to discern price movement in response to seasonal changes in supply and demand. That seasonal price variation does occur is more apparent from an examination of average monthly prices shown in Figures 4-3 and 4-4. To illustrate the limited variability of prices in Canadian port markets, prices in three of the more responsive ports -- Sambro, Clark's Harbour and Yarmouth -- are also shown.

Figure 4-2: Boston Auction Prices for Wednesdays, 1984-1985



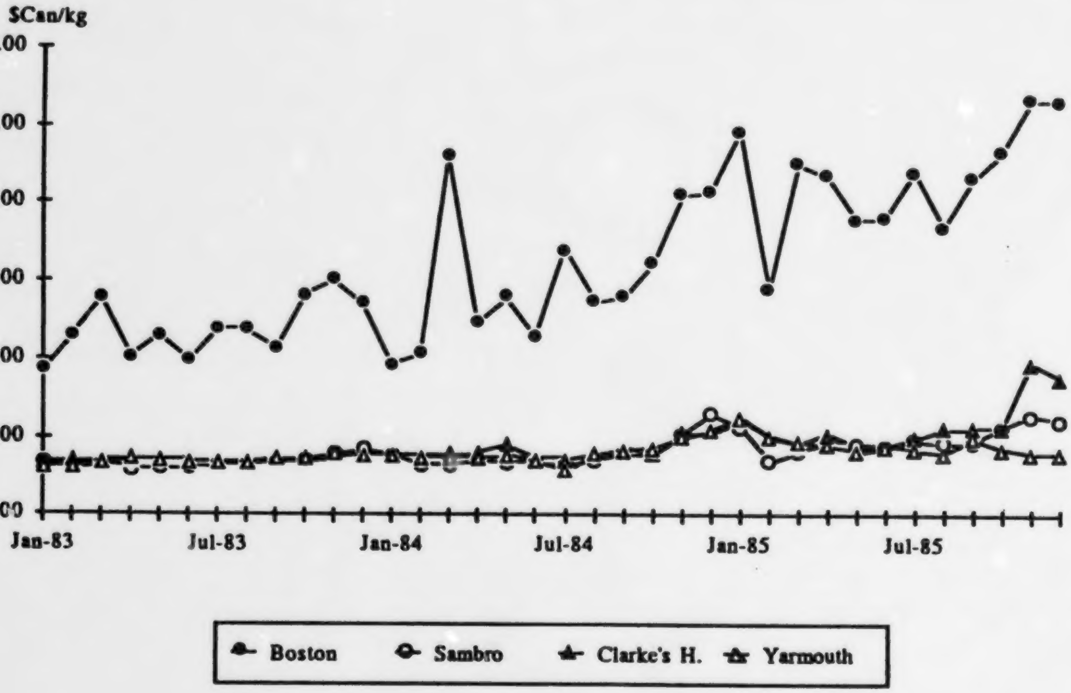
Source: U.S. Dept. of Commerce, *Fishery Market News Report*
Prepared by Gardner Pinfold Consulting Economists Ltd

Figure 4-3: Average Monthly Prices of Market Cod, Boston Auction and Selected Scotia-Fundy Ports



Sources: U.S. Dept of Commerce, *Fishery Market News Report*
DFO unpublished landings data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Figure 4-4: Average Monthly Prices of Haddock, Boston Auction and Selected Scotia-Fundy Ports



Sources: U.S. Dept of Commerce, *Fishery Market News Report*
DFO unpublished landings data
Prepared by Gardner Pinfold Consulting Economists Ltd.

The ambiguities attached to the Boston auction prices are the subject of frequent complaints about the operation of the New England fisheries market. One noted American analyst catalogues basically the same type of short run problems outlined above and describes the information generated by the public auctions in Boston and elsewhere as incomplete and not wholly accurate.[1] Even with their limitations, in the end he concludes the prices formed in the publicly reported market transactions cannot deviate significantly from true market values for more than a few days. Ultimately, knowledge of the quantities of fish around works its way into the public auction and prices are determined accordingly. In his view, the real value of the public auction prices is that they provide the best information available on seasonal and secular trend price movements.

Most active and knowledgeable market participants, including those located in Atlantic Canada, have longstanding experience with the sometimes erratic price behaviour on the Boston auction. In situations where decisions depend on price levels or changes in price levels, such as changing the price offered to fishermen, processors are likely to wait until any price change in the New England market has been sustained long enough to confirm whether it is a real rather than a temporary movement. In other words, reactions to daily price swings are likely to be muted. Consequently, to the extent that price movements in Atlantic Canada ports reflect those in Boston, they are likely to do so only over an extended period rather than on a day-to-day basis. That is, if such relationships exist, they are more likely to be found in the realm of seasonal and longer term trends than in the daily or other short-term variations. Trend lines for Boston and Clark's Harbour fitted to the data in Figures 4-3 and 4-4 lend support to this argument (Figures 4-5 and 4-6). The relationships between the trends are statistically significant and have strong correlations (for haddock, r = .88; for cod, r = .86).

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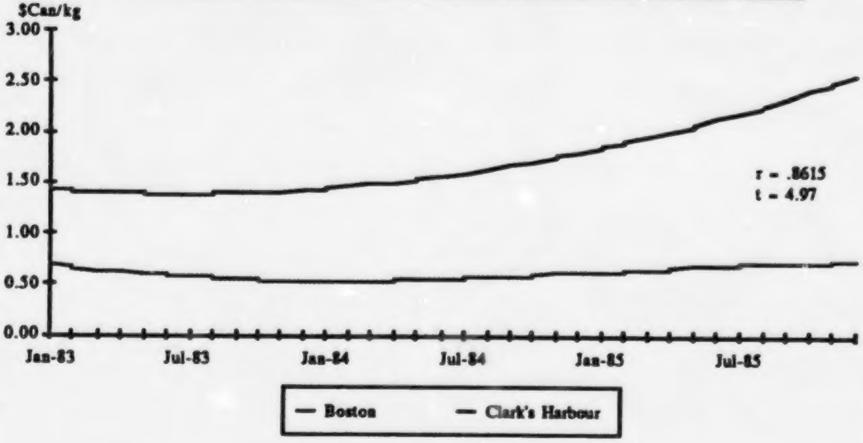
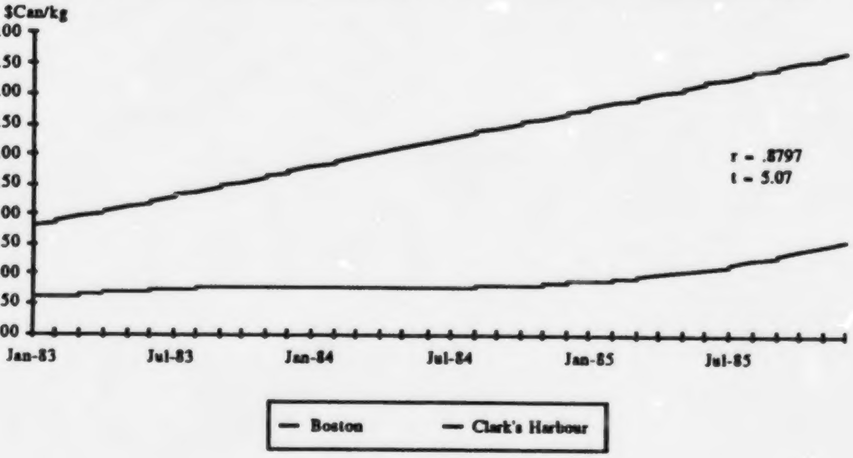
[1] James Wilson, *The Blue Sheets and the New England Fisheries Market*, 1985, prepared for the Bilateral Working Group on the Economic Development of the Fisheries of the New England Governors' Conference, Inc.

Figure 4-5: Trend Lines for Cod Prices, Boston and Clark's Harbour, 1983-1985



Source: DFO. Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Figure 4-6: Trend Lines for Haddock Prices, Boston and Clark's Harbour, 1983-1985



Source: DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Statistical Analysis of Port Market Effectiveness

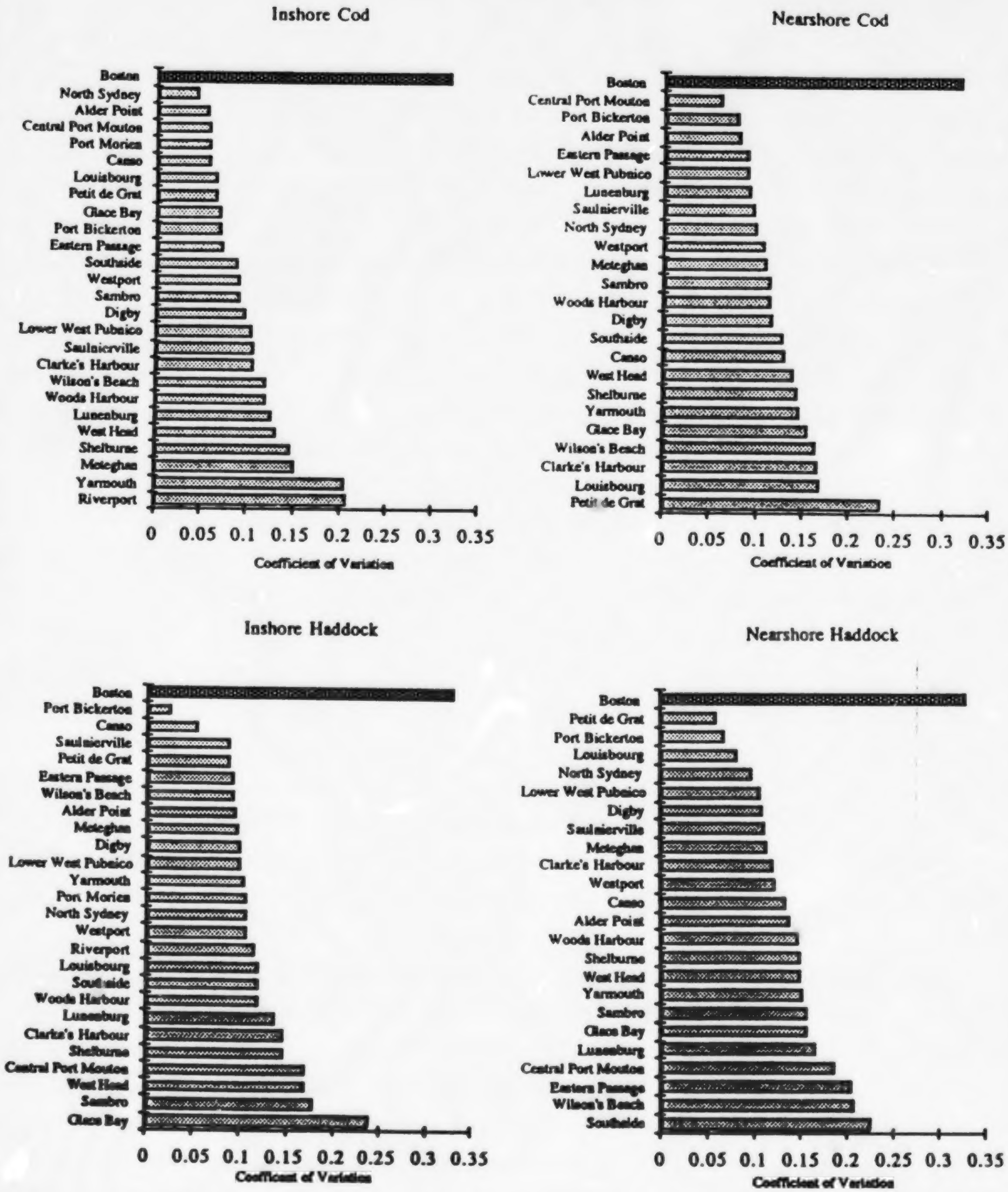
The Relationship Between Canadian and U.S. Prices

The review of port prices in Chapter Three indicates there is little short-term price movement in most port markets. Subjecting these ports to statistical analysis is considered pointless in view of the considerable price variation in the Boston price illustrated in Figure 4-2. In conducting the correlation analysis, attention is focussed on those ports exhibiting at least a minimum level of price variability. The extent of price variability is measured by computing the 'coefficient of variation'. This coefficient, the ratio of the standard deviation to the average, provides a measure of the extent to which any price variation differs from the average. For cod and haddock on the Boston auction, the coefficients of variation over the 1983-85 period are .32 and .33, respectively. By comparison, with few exceptions, the study ports have coefficients less than half as great. The study port coefficients for cod and haddock distinguished by inshore and nearshore transactions by region are presented in Figures 4-7 to 4-10. The Boston coefficients are provided for reference purposes.

The study ports selected initially for the correlation analysis are ones meeting two criteria: they have coefficients of variation, of .18 or more and few, if any, 'irregularities' in the data. The choice of .18 is arbitrary, but the results of the correlation analysis subsequently confirmed it as a reasonable cut-off point. The irregularities referred to include gaps in landings or unusually high or low prices in just a few weeks in the series. Both irregularities have a direct bearing on the size of the coefficient and can render it meaningless as a screening test for selecting ports for the correlation analysis. For example, ports such as Harbour Grace in Newfoundland, Riverport in Scotia-Fundy, Rivière-Saint-Paul in Quebec, and Beach Point in the Gulf all have relatively high coefficients of variation, but an inspection of the raw data show their size is related to gaps in landings or to substantial price changes in just one or two weeks.

The null hypothesis that a positive relationship should exist between prices in the New England market and prices in Canadian port markets was tested for 24 of the study ports, 15 in Scotia-Fundy and the balance divided among the other regions. The analysis was carried out initially using U.S. prices converted into Canadian funds. This approach was based on the assumption that buyers and sellers in Canadian ports are aware of exchange rate movements and incorporate them in their transactions. Separate tests were conducted for cod and haddock and for inshore and nearshore vessels. For reasons related

Figure 4-7: Average Yearly Variation in Cod and Haddock Prices, Scotia-Fundy Region, 1981-1985


Inshore Cod

Nearshore Cod

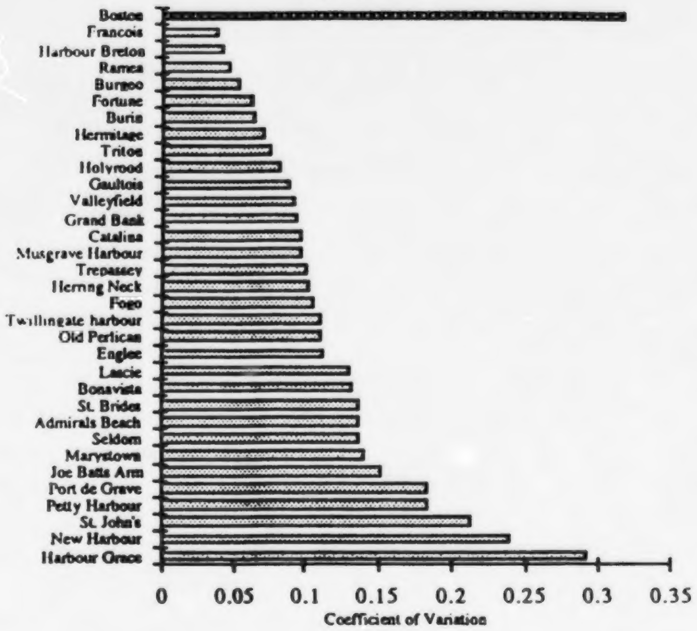
Inshore Haddock

Nearshore Haddock

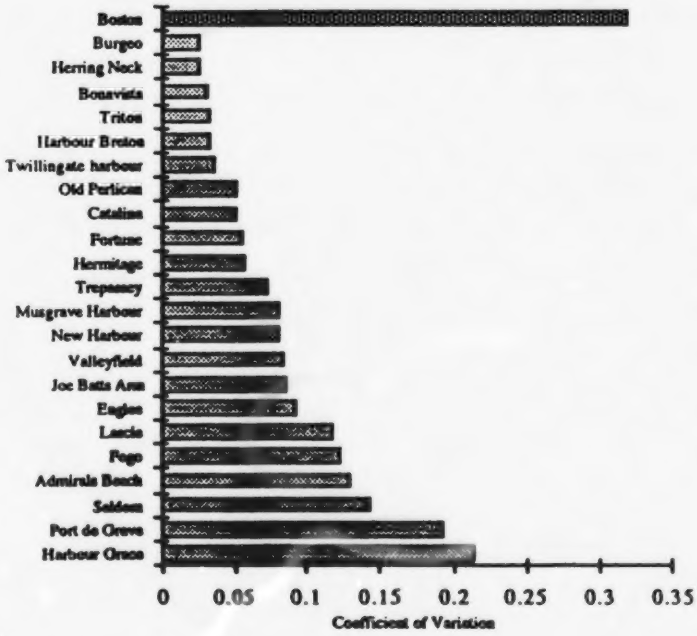
Source: DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Figure 4-8: Average Yearly Variation in Cod Prices, Newfoundland Region, 1984-1985

Inshore Cod



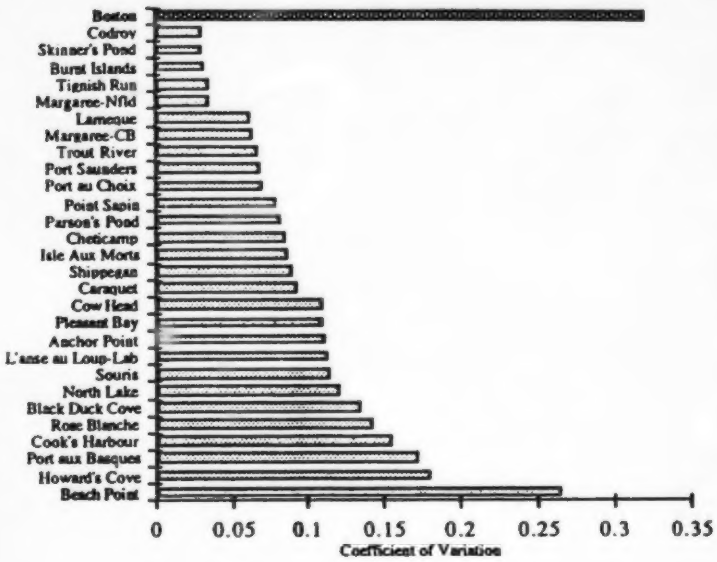
Nearshore Cod



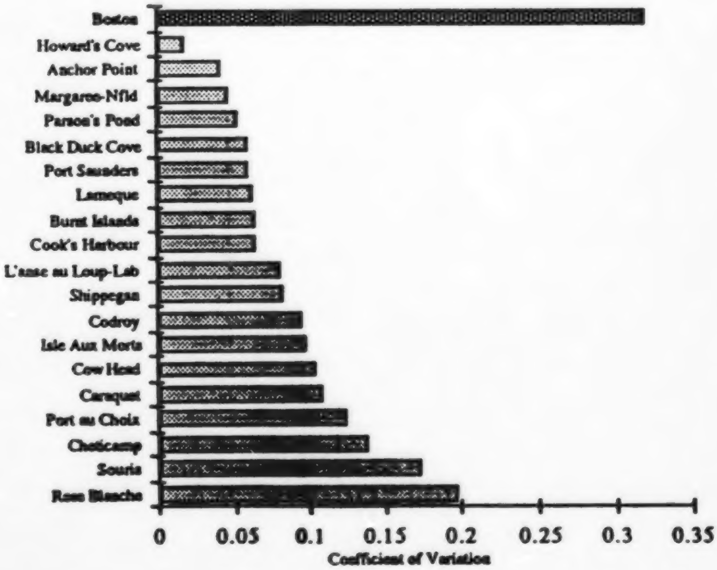
Source: DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Figure 4-9: Average Yearly Variation in Cod Prices, Gulf Region, 1984-1985

Inshore Cod

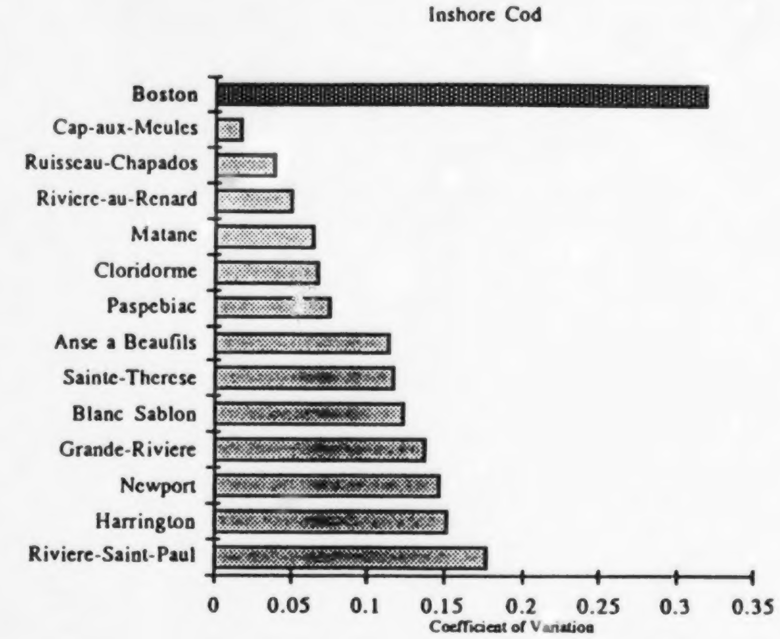


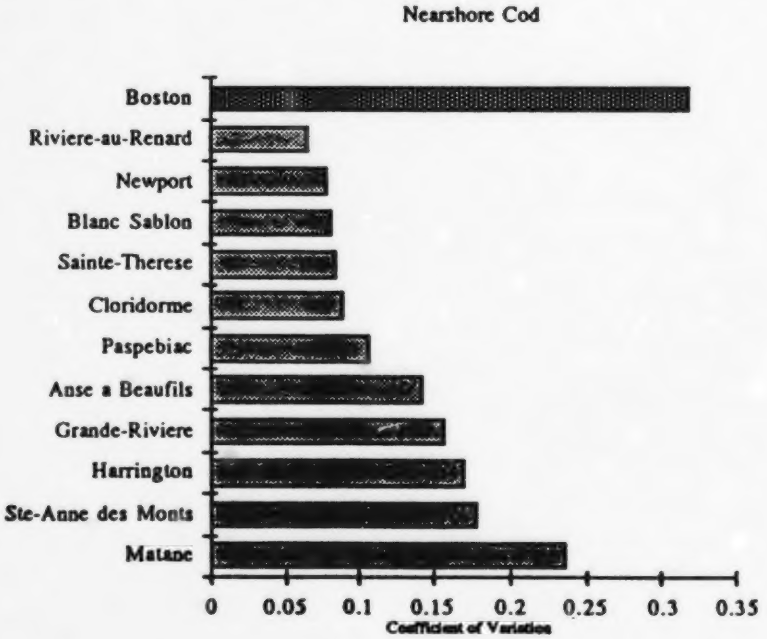
Nearshore Cod



Source: DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Figure 4-10: Average Yearly Variation in Cod Prices, Quebec Region, 1984-1985





Source: DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Table 4-1
Correlation Coefficients and t Values

	Cod				Haddock			
	Inshore		Nearshore		Inshore		Nearshore	
	r	t	r	t	r	t	r	t
Clark's Harbour	0.4467	5.11**	0.3667	2.13*	0.6334	7.07**		
Southside	0.5084	5.70**	0.2133	1.2	0.3359	1.74		
Sambro	0.3083	3.77**			0.6919	8.40**	0.5714	6.09**
West Head	0.4332	4.95**	0.2733	2.95**	0.6483	7.26**	0.4627	5.02**
Shelburne	0.1764	1.50	0.4263	4.78**	0.3776	3.16**	0.6492	7.10**
Woods Harbour					0.6332	6.92**	0.5344	5.75**
Yarmouth	0.1768	2.01*	0.2145	2.13*	0.457	4.45**	0.5702	5.34**
Glace Bay			0.0873	0.94	-0.0965	-0.82	0.3528	3.25**
Louisbourg			0.2192	1.89				
Wilson's Beach			0.4705	3.35**			0.5444	3.21**
Meteghan	0.3486	2.97**						
Riverport	-0.2885	-1.84						
Eastern Passage							0.1451	0.29
Central Port Mouton					0.1576	1.54	0.4487	3.50**
Beach Point	-0.0105	-0.06						
Rose Blanche			0.1561	1.27				
Souris			0.2138	1.42				
Port aux Basques	0.0523	0.49						
Howard's Cove	-0.195	-1.26						
Port de Grave	0.1743	1.21	0.0639	0.39				
Rivière St. Paul	0.0323	0.19						
Matane			0.5029	3.72*				

Note: * Significant at the 5% level.
** Significant at the 1% level.

Source: DFO, Unpublished Landings Data.

Prepared by Gardner Pinfold Consulting Economists Limited.

to the coefficient of variation or the nature of the fishery, all four species and vessel combinations were not, or could not be, tested for each port. The results of the analysis by species and vessel class are presented in Table 4-1 and may be summarized as follows:

- *Inshore Cod.* Of the twelve ports tested, a statistically significant relationship is found in six. All are in southwest Nova Scotia. The relationships are relatively weak, with the correlation coefficients ranging from 0.18 (Yarmouth) to 0.51 (Southside).
- *Nearshore Cod.* Of the twelve ports tested, a statistically significant relationship is found in six, five in southwest Nova Scotia and one in Quebec. The relationships are relatively weak, with the correlation coefficients ranging from 0.21 (Yarmouth) to 0.50 (Matane).
- *Inshore Haddock.* Of the nine ports tested (all in Scotia-Fundy), a statistically significant relationship is found in six. The relationships are relatively strong compared with cod, with the correlation coefficients ranging from 0.38 (Shelburne) to 0.69 (Sambro).
- *Nearshore Haddock.* Of the nine ports tested (all in Scotia-Fundy), a statistically significant relationship is found in eight. The relationships are generally stronger than for cod, but weaker than for inshore haddock, with the correlation coefficients ranging from 0.35 (Glace Bay) to 0.65 (Shelburne).

These results show that in only a few of the study ports is there a statistically significant relationship between landed groundfish prices and fresh fish prices in the New England market. These ports are confined primarily to the Scotia-Fundy Region, and more specifically to southwest Nova Scotia. While the relationships are statistically significant, in only one or two cases are there what might be regarded as relatively strong correlations. In general, the price relationships are stronger for haddock, not only a more valuable species than cod, but one for which there are fewer alternative product forms. The results suggest that *at best* port market prices are responsive to long-term trends in the New England market, but are not responsive to short-term fluctuations.

The relationship was also tested using U.S. prices expressed in U.S. funds. This approach eliminates any effect the exchange rate might have on price variation. It is based on the assumption that buyers and sellers in port markets are either unaware of, or indifferent to, exchange rate movements, but respond directly to changes in the U.S. price. The results of the analysis using this approach are summarized in Table 4-2. In general, the relationships are slightly weaker, but the differences are arguably not all that meaningful. If any conclusion can be drawn from the differences, it is that buyers and sellers appear to take the exchange rate into account.

Table 4-2
Correlation Coefficients and t Values

	Cod				Haddock			
	Inshore		Nearshore		Inshore		Nearshore	
	r	t	r	t	r	t	r	t
Clark's Harbour			0.3391	1.97*	0.5950	6.64**		
Sambro					0.6702	8.14**	0.5301	5.65**
West Head	0.4317	4.60**						
Shelburne	0.1456	1.23					0.6222	6.80**
Woods Harbour					0.5942	6.50**		
Yarmouth	0.1346	1.53	0.1897	1.89				
Glace Bay			0.0512	0.55				
Louisbourg			0.2459	2.13*				
Wilson's Beach			0.4591	3.27**				
Meteghan	0.3332	2.85**						
Riverport	-0.3098	-1.98						

Note: * Significant at the 5% level.
** Significant at the 1% level.

Source: DFO, Unpublished Landings Data.

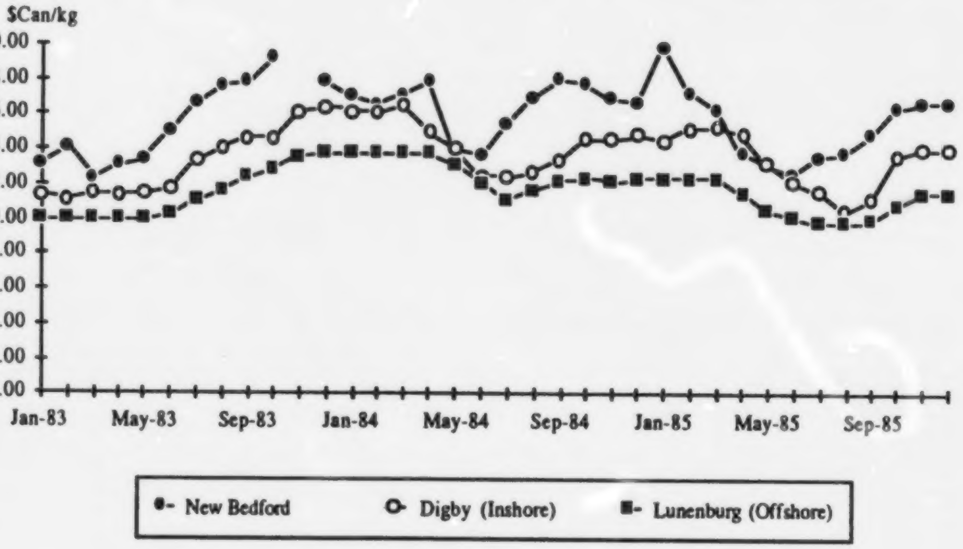
Prepared by Gardner Pinfold Consulting Economists Ltd.

A species of some comparative interest in the discussion of port market pricing behaviour is the scallop. The U.S. is the principal market for scallops, in recent years accounting for upwards of 80 percent of Canadian production. Figure 3-3, introduced earlier, shows that exports vary with landings, being low during the winter months and reaching a peak during mid-summer. Prices also vary seasonally, reflecting demand and supply conditions. The relationship between U.S. (New Bedford) and Canadian (Lunenburg and Digby) prices is depicted in Figure 4-11. The relationship appears to be a close one, as prices follow the same seasonal and long-term trend.

For both Lunenburg and Digby, the relationship is statistically significant; the t-values are 6.56 and 4.72, respectively. In statistical terms, though, the relationship is not as strong as Figure 4-11 might at first glance suggest. The correlation coefficient for Lunenburg is .61, compared with .45 for Digby. Upon closer examination, Figure 4-11 reveals considerable lags (in some cases two to three months) in the response of prices in

Lunenburg and Digby to changes in the New Bedford price. The lagged response is explained largely by U.S. market volatility and the uncertainty on the part of Canadian buyers and sellers about whether price changes are temporary or will be sustained over the longer term. The lags appear to be longer in the case of Digby prices which helps to explain the weaker relationship with New Bedford.

Figure 4-11: Monthly Scallop Prices, New Bedford, Digby and Lunenburg, 1983-1985



Source: Boston Bluesheet Data, 1983-1985
DFO Unpublished Landings Data
Prepared by Gardner Pinfold Consulting Economists Ltd.

Lying behind these prices and price movements are differences in market structure and pricing behaviour. The scallop fishery is prosecuted by some 75 offshore draggers operating primarily on Georges Bank and about 90 inshore draggers operating primarily in the Bay of Fundy. Ownership of the offshore vessels is divided among about 10 companies, most of which are vertically integrated. About half the fleet operates from the adjacent ports of Lunenburg and Riverport, with the balance operating from about five other ports in southwest Nova Scotia. The inshore vessels are independently owned, with over half the fleet operating from Digby, another quarter of the fleet from Wilson's Beach in New Brunswick, and the balance from a handful of ports in Nova Scotia on the Bay of Fundy.

Pricing behaviour in both the offshore and inshore sectors falls at least nominally into the market transaction category described in Chapter Three. Landed prices for inshore scallops are generally about $0.30/kg higher than offshore prices. Processors interviewed about pricing behaviour indicated the difference is related to higher final product prices arising from market perceptions about the better quality of "Digby" scallops. Implicit in this explanation is a statement about competitive conditions, in that inshore fishermen are able to bargain away some of this apparently higher product value. That competition should be greater in the inshore sector is not surprising since there are about 90 independent sellers and some 25 buyers in the various inshore ports (18-20 in Digby alone). There is undoubtedly price leadership in the inshore sector, but with this many buyers and sellers some price competition is inevitable.

The structure of the offshore sector is different and leads to different pricing behaviour. The offshore vessels are part of vertically integrated companies so there is no scope for competition among buyers and sellers as there is in the inshore. According to the collective agreements between the companies and unions, prices are set according to market conditions with the only restriction that they "not be below the going price for deep-sea scallops in Nova Scotia". From the data in Figure 4-11, it is clear prices follow market conditions. What is less clear is the mechanism by which prices are transmitted from the market to ports in Nova Scotia. The Lunenburg prices shown in Figure 4-11 are not merely representative of offshore prices in other ports, they are the same. The timing and size of every price change is identical in each of the offshore ports. This provides strong evidence of either price leadership or, more likely, cartel-like price agreements.

The Relationship Between Prices and Landings

For those ports where the port price exhibited a statistically significant relationship with the Boston prices, the next question is whether fishermen adjust their fishing behaviour in response to port market price changes? This was tested by correlating weekly prices and landings for the identified ports. The results are summarized in Table 4-3. For inshore cod, three of the seven ports show a statistically significant relationship at the 5 percent level. For two ports, Yarmouth and Clark's Harbour, the data show price and

Table 4-3
Correlation Coefficients and t Values
Port Prices vs. Landings, 1983 to 1985

Port	Cod			
	Inshore		Nearshore	
	r	t	r	t
Riverport	0.0369	0.24	-	-
Yarmouth	0.2174	2.50**	0.2321	2.36*
Meteghan	-0.1351	-1.16	0.1954	2.12*
Louisbourg	0.1277	1.33	-0.2832	-2.47
Clark's Harbour	0.1843	2.13*	0.6785	3.93**
Wilson's Beach	-0.347	-3.57	-0.2551	-1.86
Sambro	-0.0091	-0.11	-0.0075	-0.08

Port	Haddock			
	Inshore		Nearshore	
	r	t	r	t
Glace Bay	0.0411	0.35	-0.1110	-1.02
Sambro	0.0505	0.62	-0.1748	-1.89
West Head	-0.2620	-2.99	-0.0061	-0.07
Southside	-0.0070	-0.08	0.0943	0.49
Wilson's Beach	-0.0265	-0.19	0.0853	0.50
Eastern Passage	-0.0628	-0.71	-0.0202	-0.04
Clark's Harbour	-0.1389	-1.57	0.0224	0.13

Note: * Significant at the 5% level.
** Significant at the 1% level.

Source: DFO, Unpublished Landings Data.

Prepared by Gardner Pinfold Consulting Economists Limited.

quantity are positively related while for the third port, Wilson's Beach, the relationship is negative.

Nearshore cod landings in four of the six ports exhibit a significant relationship. Once again, one port, Louisbourg, shows a negative price relationship while it is positive for the other three ports. Except for the Clark's Harbour nearshore case, where it is moderately strong, all of the correlation coefficients suggest only a weak price-landings relationship. Only one port, West Head, exhibits a statistically significant relationship between haddock prices and landings.

In general, the analysis indicates a weak to non-existent relationship between port price and port landings. That such should be the case is perhaps not surprising since there are a number of factors effectively preventing fishermen from timing their fishing effort in response to price signals. Inshore fishermen fish competitively within a global quota system. The common property characteristics of the resource provide a strong incentive for each fisherman to maximize his share of the catch. As long as price is high enough to cover opportunity costs, the fisherman can do no better than to catch as much as he can as fast as he can.

2. Alternative Methods of Price Formation

European Fish Auctions

Central to the analysis of price formation in this report is the question whether prices in port markets are set competitively. The conclusion reached earlier is they are not. For reasons related to market structure, buyer-seller ties and effective price leadership, price competition exists in a very few individual port markets, and even in these cases the degree of competition is arguably relatively weak. The terms of reference for this study specifically asks whether market efficiency could be improved if fish auctions were introduced. To answer this question, the institutions and mechanisms governing auctions in several European ports are examined. In addition to price formation, the issue of how auctions influence quality is also considered.[2]

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[2] Much of the descriptive material on European auctions is derived from, *Price Systems at the Landing Stage in Fishing Industries of OECD Member Countries*, 1966, published by the Organization for Economic Cooperation and Development. Though the publication is dated with respect to landings and price information, it remains relevant on matters related to structure and operation.

The auction is the single most important method of effecting the first-hand sale (i.e., between fishermen and buyers) of fish in European port markets. Within the European Economic Community (EEC), virtually all fish destined for the fresh market is disposed of through auction sales. The fresh fish market is characterized by a wide range of price/quality options reflecting the diverse and changing tastes of its 60 million people. The auction system is ideally suited to this type of market because it is capable of rapid adjustment to produce the appropriate species/quality mix at market clearing prices.

The major fishing ports where auctions exist are Bremerhaven and Cuxhaven in West Germany; Grimsby, Peterhead, and Aberdeen in the U.K.; Ijmuiden and Urk in the Netherlands; Boulogne in France; and Esbjerg in Denmark. In most cases, the auctions date back to the late 19th or early 20th century. These ports owe their development to four common factors:

- the need for speed in selling and transporting fish arising from the demand for fresh fish;
- large populations and good markets in close proximity;
- close proximity to fishing grounds, regular landings, and sufficient population to justify and maintain the infrastructure; the larger ports are each home to some 150-200 vessels landing from 30 to 100 thousand tonnes of fish annually; and,
- the need for fishermen to find the largest concentration of buyers possible to counterbalance their weakness as sellers of a highly perishable product; the number of registered buyers at the larger auctions would fall in the 75-200 range, with as many as 25-50 present on any given day.

Summary information on landings, species, number of vessels and number of buyers for these ports is given in Table 4-4.

The auction system has not developed, or has not been as successful, where landings have not been concentrated, or where, in the absence of a local demand for fresh fish, landings were processed into frozen or cured products. These circumstances are descriptive of most ports in the major fishing and fish exporting nations, Iceland, Norway and Canada. In Iceland and Norway groundfish landings are sold at fixed prices negotiated in advance between fishermen's and processors' organizations.

Table 4-4
Number of Buyers and Sellers and Volume of Sales,
Selected European Port Auctions

	Frequency	Registered Buyers		No. Vessels		1985 Volume (tonnes)
		Total	Average	Total	Average	
Grimsby (U.K.)	Mon-Fri, 7-8AM	200	30	50	20	41,000
Peterhead (U.K.)	Mon-Fri, 7-8AM	200	30	50	20	82,000
Boulogne (France)	Mon-Sat, 7-8AM	160	30	170	50 (off) 170 (ins)	95,600
Bremerhaven (West Germany)	Mon-Sat, 7-8AM	75	20	n/a	n/a	42,400
Cuxhaven (West Germany)	Mon-Sat, 7-8AM	75	20	n/a	n/a	43,900
Ijmuiden (Netherlands)	Mon-Fri, 7AM	100	30	200	40	35,000

Source: "World Fishing", January, 1986; Pers. Comms. with auction managers.

Virtually all European auctions are display auctions (Boulogne, in France is an exception). Vessels unload at night (usually commencing between midnight and 3:00 a.m.) to allow buyers time to survey the fish on offer before the auctions begin the next morning (usually at 7:00 or 8:00 a.m.). If not done at sea, the fish is sorted and transferred into boxes and iced after unloading. Increasingly, though, the fish is being boxed at sea to minimize handling, maintain quality and to reduce the time between unloading and sale. Between display and removal by the buyer, the fish may lie in the auction hall from 10 to 12 hours. The auction itself usually lasts only 2-3 hours. Public health inspection is carried out at most ports, as is voluntary grading by fishermen's or other trade organizations, or by market authorities.

There are two different types of auction, the "bidding and over-bidding" system and the so-called "Dutch" auction. With the former, the most common, increasing bids are announced by the auctioneer until the highest bid is reached and accepted. The latter, where the auctioneer starts by asking a high price which is lowered every few seconds until a buyer is found, is practiced in the Netherlands, at one or two ports in the U.K., and in

Portugal, Spain and Belgium. The Dutch auction system is generally the quicker method. In most auctions, fish is displayed separately by vessel and species, with sales in lots according to species and quality category where differences exist. Differences may arise from fish size and freshness. The successful buyer has the option of taking the entire lot or only part of it. If only part is taken, the remainder is again put up for sale.

Auctions are generally operated under the responsibility of local authorities who usually provide buyers and sellers with the means for controlling/participating in the relevant bodies. The often extensive auction facilities, including wharves and unloading facilities, enclosed display areas, and cold stores are owned either by the state, municipality, or in some cases by private companies. The costs incurred in operating the facilities and running the auctions are defrayed through fees ranging from 1-3 percent of sales levied on either buyers or sellers. State or municipal support is required in some cases.

- In Denmark, responsibility for conducting the auctions rests with private companies, while the facilities are either owned by the state, municipality or the auction company. Auctions are held in 20-25 smaller ports in addition to the main ports of Esbjerg, Skagens, Hirtshals and Tyboron.
- In France, the auctions are run by the local Chambers of Commerce, who also generally own the auction facilities. In Boulogne, for example, one of Europe's largest auctions, the facilities include not just the hall and unloading facilities, but the land around the hall which is leased to fish processors, vessel outfitters and other related businesses who have built their own facilities on-site. Besides Boulogne, the other major auction centres are Lorient, La Rochelle and Dieppe. Auctions are also held in 30-35 smaller ports, some with landings as low as 1,500 tonnes.
- In Germany, the auction facilities are operated on behalf of the State. Auctions are concentrated in four cities: Bremerhaven, Cuxhaven, Kiel and Hamburg. The auction facilities at Bremerhaven, one of the largest and most modern fishing ports, include 1,500 m of wharf for unloading, a 15,000 m^2 auction hall, and cold storage capacity of 60,000 tonnes. The auction administration also acts as landlord to the many buyers, processors and companies providing back-up services, owning not just the land these companies occupy, but the buildings too.
- In the Netherlands, only the facilities at Ijmuiden are state-owned; facilities at the other ten main ports are owned and operated by the municipalities.

One of the obvious advantages of the auction system is its ability to dispose rapidly of mixed fresh fish. Demand and supply determine prices which automatically adapt to variable landings. Where there is wide variation in species, sizes and qualities, as there is in many European ports, contractual or fixed price arrangements would be too complicated to meet the often diversified marketing arrangements. In the auction system, the way in which choice is made by the buyer closely approximates quality grading and sorting that would occur under an elaborate classification system. The auction ensures the best qualities obtain the best prices.

From the perspective of the fisherman, one of the main advantages of the auction system is that it is straightforward: buyers compete openly and prices are established freely in accordance with supply and demand. But if market determined prices have their advantages, they also have one major disadvantage. One of the inherent dangers of the auction system is that it allows sudden and substantial drops in prices with sometimes serious consequences on income. To avoid this problem, the EEC has developed an elaborate institutional framework including provision for minimum prices.

Fisheries within the EEC are governed by a Common Fisheries Policy (CFP). The fisheries of each member state operate (in principle, at least) within the framework of the CFP. Negotiations leading to the adoption of a CFP began in 1970 and were completed in 1983. The CFP covers three issues: market organization, structural adaptation (fleet rationalization) and resource management (quotas and access to EEC waters). Market organization is the central issue in the assessment of price formation.

The common organization of the market was the first element of the CFP to be implemented and has been in place for some years. It has two key elements: Producers Organizations and a price regime for fish and fish products. The Producers Organizations (essentially fishermens' associations or unions) are national bodies responsible for the market regime at the national level. Their responsibilities generally include implementation of catch plans, regulation of supply, establishment of marketing standards and regulation of prices.

The price regime is intended to insulate fishermen from world market influences and from instability in internal (EEC) markets. This is achieved through a system of tariffs and price supports applied to market-determined prices for fish and fish products. The complex regime involves four related but functionally distinct prices:

- The *Guide Price* is perhaps the key variable since from it are derived the prices which serve as the basis for determining frontier protection and internal support measures. Guide prices for fish are fixed once a year. They are based on the average of prices recorded at representative ports in the three years immediately proceeding the year in question. Production and demand prospects are also considered. In essence, the guide price represents the internal first-hand sale price (determined at the auctions) which should be obtainable given normal marketing circumstances.

- The *Withdrawal Price* is the price below which Producers Organizations withdraw fish from over-supplied markets. Producers Organizations will not sell fish supplied by their members below this price. Fish withdrawn from the market is sold for industrial purposes (sold "into intervention") or, in special circumstances, put in storage ("carry-over") to be marketed at a later date for human consumption. Under recent changes to the support system, short-term storage and basic processing of fish for storage would be partially financed by an EEC fund in times of temporary glut of valuable food species.

- The *Reference Price* is the price at which imports may enter the EEC. The function of the reference price is to ensure that cheap imports do not undermine the income of community fishermen. In essence, the reference price system is used to protect the guide price from external pressure.

  Reference prices are established for the main categories of fish products (fresh, chilled, frozen). For products for which a withdrawal price is fixed (fresh, chilled), the reference price equals the withdrawal price. For semi-processed product (frozen, fillet), processing costs are taken into account in establishing the reference price.

- The *Free-At-Frontier Price* is the recorded price at a specific marketing stage (processor, wholesale) of product at the point of entry into a member state. The FFP refers to the product price before application of the Common Custom Tariff (CCT) and charges relating to transportation and handling. It is a key element in the operation of the reference price system.

The EEC market and price regimes act to stabilize prices in the short run and to support prices over the long term. Price stabilization is achieved through the withdrawal system. If oversupply places downward pressure on prices, fish is withdrawn from the market at the point where the market price reaches the pre-determined withdrawal price. Producers receive a percentage of the withdrawal price based on the quantity of fish withdrawn. The difference between that price and the prevailing market price is paid from that country's share of the price support fund (the European Agriculture Guidance and Guarantee Fund). This aspect of the Fund is financed in part from member state contributions and in part from a levy on first-hand sales. The levy ranges from between 0 and 2 percent, depending on the amount in that section of the Fund and on current and anticipated market conditions.

Internal (EEC) prices also receive longer term support through the operation of the reference price system. This system is intended to prevent entry of cheap imports into the market which could undermine Community prices and incomes.

A schematic diagram showing the relationship of these prices in the formation of local market prices and the determination of fishermen's incomes is set out in Figure 4-12.

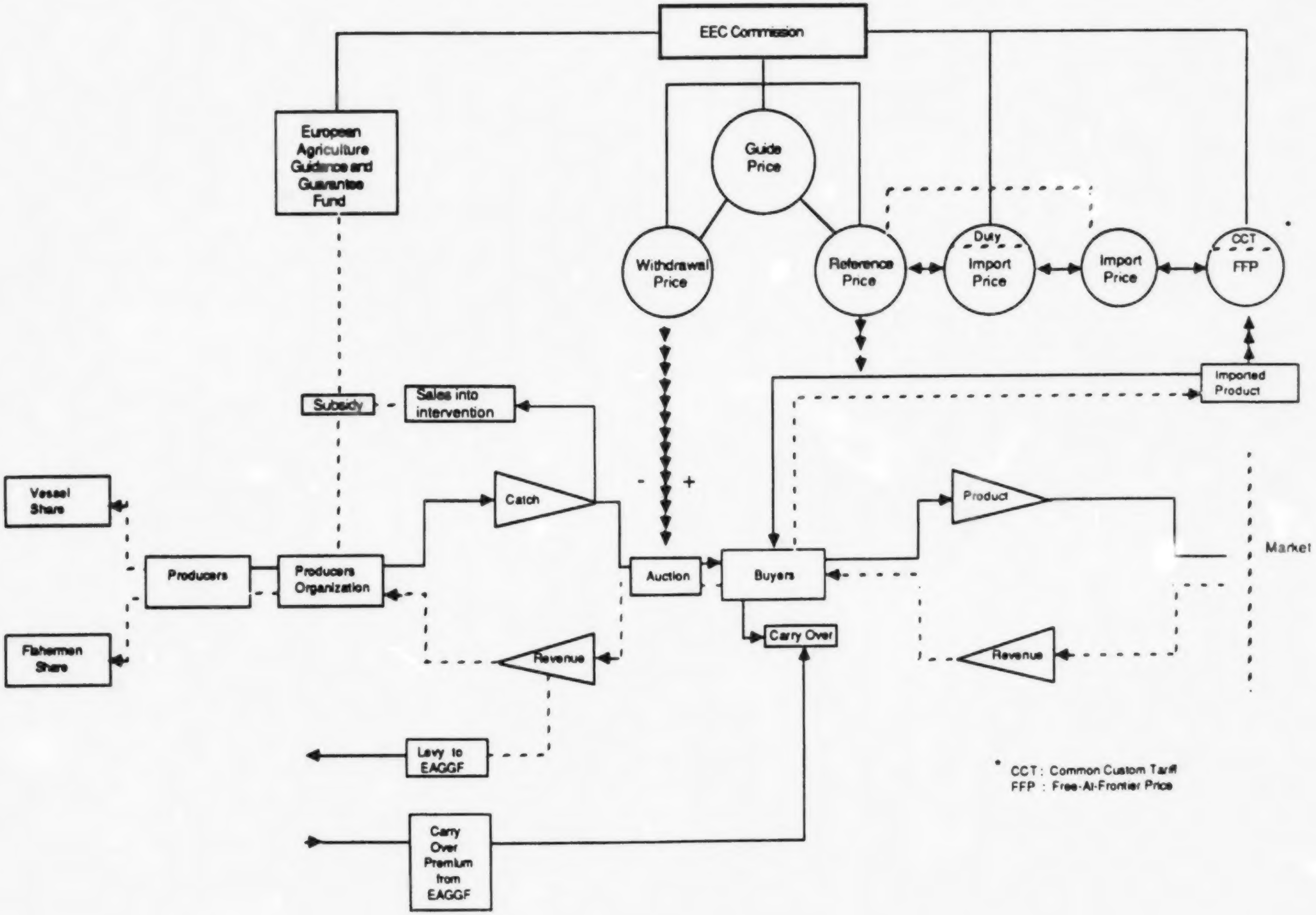
Technological advances in food processing (e.g., quick freezing and secondary processing) and distribution, and changes in marketing have helped to diminish somewhat the importance of auctions in Europe. These factors plus the introduction of 200-mile fishing zones, the growth of vertically integrated fishing companies and an expansion in the use of factory freezer trawlers in coastal fisheries have combined to reduce the amount of fish passing through the auctions. But traditions die hard. Though auctions are less important than they were during the 1950's and 1960's, they continue to be a vital part of the fish marketing system in the EEC, and are likely to remain so as long as there is a market for fresh fish and as long as independent fishermen fishing in coastal waters continue to account for a substantial share of EEC landings.

Fish Auctions in a Canadian Context

Any attempt to introduce auctions in Atlantic Canada would meet with considerable difficulty, not simply because communities are conservative and would resist change to established ways of doing things, but because in most areas the circumstances are not conducive to this method of transacting the sale of fish and because there is no guarantee buyers and sellers would be better off as a result. If the European experience is any guide, the necessary and sufficient conditions to support a fish auction in any given port in Atlantic Canada would include:

- a significant quantity of landings, with some regularity throughout the year;
- a large population in close proximity to the port generating a strong demand for fresh fish;
- a large number of competing buyers in the port;
- landings of highly valued species for which demand is relatively price elastic;

Figure 4-12 : Schematic Representation of Price and Income Determination in the EEC Fresh Fish Market


EEC Commission
European Agriculture Guidance and Guarantee Fund
Guide Price
Withdrawal Price
Reference Price
Duty
Import Price
Import Price
CCT
FFP
Imported Product
Subsidy
Sales into intervention
-
+
Vessel Share
Fishermen Share
Producers
Producers Organization
Catch
Auction
Buyers
Product
Market
Revenue
Carry Over
Revenue
Levy to EAGGF
Carry Over Premium from EAGGF

* CCT : Common Custom Tariff
FFP : Free-At-Frontier Price

Source: Gardner Pinfold Consulting Economists Limited, *Elements in the Determination of Fishermen's Incomes in Iceland, Norway and Denmark: An Overview*, 1982.

- introduction of a system providing for minimum prices to guard against severe drops in price;
- government financial and organizational support for the establishment and operation of the auction facilities; and,
- willingness on the part of fishermen and processors to depart from traditional methods of transacting fish sales.

Landings and Fresh Fish Demand

While there are a number of ports in Atlantic Canada that have adequate landings, there are few either individually or in clusters combining adequate landings and proximity to fresh fish markets. In Europe, the minimum annual quantity necessary to support an auction appears to be in the range of 4,000 to 5,000 tonnes, but the more successful auctions in terms of prices paid are the larger ones with annual quantities in excess of 20,000 tonnes. Landings at the offshore ports are high enough, but they are landed by trawlers owned by vertically integrated companies. It is safe to assume the companies would not be interested in offering this fish for auction. If auctions were to be introduced, it would be in inshore ports.

It is difficult to say what the minimum quantity for a successful auction would be. The display auction introduced in Portland in 1986 offers some guidance. Officials there indicate an annual throughput of about 10,000 tonnes will be necessary to cover operating costs.[3] Only time will tell whether that quantity will be enough to attract the buyers necessary for a truly competitive market. The auction officials are optimistic. Within two months of start-up, the auction had attained an annual rate of sales of about 5,000 tonnes. Officials were particularly pleased because a number of the vessels offering fish had previously landed their catches in Gloucester. They were attracted by the higher prices. So far, the auction has attracted about 30 registered buyers. On the day the consultant visited it, there were seven buyers in attendance.

Two or three ports along the south coast in Newfoundland (e.g., Rose Blanche and Port aux Basques) might qualify by virtue of quantity and regularity of landings, but distance from markets alone would rule them out. Landings in ports in Prince Edward Island, New Brunswick and Quebec are generally modest and highly seasonal (Tables 2-10 and 2-12 and Figure 3-4 would attest to this). They reach their peak in summer when fresh fish prices are at their lowest. While these factors would not necessarily rule them out, when combined with distance from market, these ports would not be strong candidates. Another factor working against ports in these areas is the limited range of groundfish species landed. Cod is by far the predominant species, and few ports in the Gulf, Quebec and Newfoundland Regions land significant quantities of other important species such as haddock or sole on a regular basis, if at all. Buyers at auctions generally serve a diverse range of market interests and one of the attractive features of the European auctions, (and also of Portland), is the wide range of species available.

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[3] Pers. Comm. James Salisbury, Manager, Portland Auction, June, 1986.

The inshore ports offering the greatest potential for establishing an auction are in southwest Nova Scotia. Several have annual landings in excess of 5,000 tonnes, and more importantly perhaps, total landings of the several ports concentrated in this area are substantial. For example, between Shelburne and Yarmouth, a distance of some 75 km by road, there are some 60 ports with combined groundfish landings in 1984 of about 45,000 tonnes. The fishery is seasonal, but less so than in other areas. A wide range of species, including cod, haddock, pollock, redfish and flounder, is available. While there is no fresh fish market of any consequence in the immediate area, these ports are less than a day away from Boston via the ferry from Yarmouth to Maine. The substantial proportion of Nova Scotia exports that is currently shipped fresh to the U.S. (about 60 percent of groundfish exports to the U.S. in 1984 and 1985) provides ample evidence that distance is not a problem.

Having suggested two key conditions could be met -- adequate fish supply and adequate fresh fish demand -- there remain three critical questions. Who Would Sell? Who Would Buy? Who Would Manage?

Who Would Sell?

Since there is little prospect the auction would be supplied by offshore trawlers, supply would have to come exclusively from inshore boats. But would inshore fishermen participate? Whether they would depends, of course, on their assessment of the relative merits of the auction vs. the existing system based on mutual dependence. From the fishermen's perspective the main argument in favour of the auction system is the open competition which, under ordinary circumstances, should lead to generally higher prices. Also, the auction differentiates on the basis of quality; fishermen who produce better quality fish are rewarded with higher prices. But there are a number of negative elements that would weigh heavily in the decision.

Secure Demand and Stable Prices

The current system of price formation meets an important objective of both fishermen and processors: it provides stability in a relationship based on mutual dependence. Stable demand means not only that processors buy the preferred species, but that they buy *all* fish irrespective of species, size or quality. Under the auction system, buyers would purchase the preferred species and sizes first (large and market cod and haddock). Fishermen might find they have no market for the less desirable species such as hake, cusk and pollock.

Stable prices generally mean the processor pays the 'going price' irrespective of quality, or demand and supply conditions. In other words, buying all fish is part of the price paid for securing *any* fish, and also for securing the most profitable fish. With an auction, the fisherman might obtain higher prices for part of his catch and lower prices for the balance, assuming he could sell it at all. Overall, he might be better or worse off.

Minimum Prices

Auction prices are subject to sharp fluctuations, including, of course, dramatic price drops. Within the existing system of price formation, the processor acts as a buffer, taking advantage of short-run price increases while absorbing short-run price declines. An auction system would have to be accompanied by some scheme guaranteeing protection from sharp price drops if it is to be attractive to fishermen.

Buyer-Seller Ties

An important element of the traditional buyer-seller relationship is the service and supply role played by the buyer. In a truly competitive auction, these ties would be broken. The fishermen would have to look elsewhere for this support. Presumably, private interests would emerge to fill the void left by processors, though fishermen might fear at higher cost. Such service and supply companies are an integral part of the European auction facilities.

Location

The location of the auction port or ports would also be an important factor. By European standards there are a number of ports with the minimum level of landings necessary to support an auction. In Nova Scotia, without a tradition of an auction system, the quantities on offer would probably have to be at least twice as great, not just to cover costs, but to attract a sufficient number of buyers to ensure truly competitive prices. In other words, a facility that combined the supplies of several ports would appear to stand a better chance of success.

The best option would appear to be a central facility, say at Shelburne or Yarmouth, or possibly somewhere on Cape Sable Island. This means some fishermen would have to adjust their pattern of operations by fishing from and/or delivering to a different port. This may mean higher fishing costs in the short run. Alternatively, a central facility may mean trucking fish from other ports. Not only would this add to costs, but the increased handling could affect quality and have a detrimental effect on prices. Lastly, a more rigorous schedule would be imposed on fishermen since deliveries would have to be timed to meet the auction deadline.

Who Would Buy?

In principle, the buyers would include anyone who needed fish: processors now buying from inshore vessels, integrated companies, and buyers with minimal processing facilities. For processors relying on the inshore fishery, the auction would be a source of fish for topping up regular supplies from inshore fishermen (though for some processors, regular supplies would presumably be lower since these supplies would be destined for the auction). Integrated companies would rely on the auction to fill gaps in supply or to meet particular market requirements. Buyers with minimal processing facilities (and without established ties with inshore fishermen) would see the auction as their source of dressed fish for direct shipment to fresh markets in the U.S. and Canada. Although the proportion of total purchases accounted for by such buyers is relatively small at present, their number and their importance could be expected to grow with the introduction of an auction.

The relative merits of the auction system would vary by type of buyer. For all three categories the advantages of an auction are obvious: it provides a ready source of supply without the need to develop and maintain an often elaborate set of relationships with inshore fishermen. For integrated companies and buyers with minimal facilities, the auction has few disadvantages. The same cannot be said for processors relying on the inshore fishery, at least not for those processors with a committment to markets other than fresh fish.

Secure Supply and Stable Prices

Historically, most fish bought by inshore processors has been destined for processing into salted and, to a lesser degree, frozen products. Just as the European auction system is well suited to the characteristics of the fresh fish market, so too has the existing system in Atlantic Canada been well suited to the characteristics of the final markets for these products. Markets for these products are relatively stable when compared with the fresh fish market. To meet market requirements and to ensure acceptable levels of plant utilization and returns on investment, processors strive to maintain a secure supply of raw material. This can only be accomplished by avoiding open competition based on price. Security of supply and stable prices based on buyer-seller ties characterize the inshore sector. Both would be threatened by the introduction of the auction system.

This would be a problem for processors, the bulk of whose production continued to be destined for traditional salt and frozen markets. It would be less of a problem for processors who are heavily involved in supplying the fresh market. With about 60 percent of Nova Scotia's groundfish exports to the U.S. now in fresh form, there are clearly a number of processors in this position. Under an auction system they would buy only the fish they needed in the quantities and at the prices dictated by the market. They would no longer be bound as they are now to buy all the fish supplied to them by 'their' fishermen at established prices. Even now, for those in this position the term processor is something of a misnomer since for much of their production there is little or no actual processing involved.

Location

The introduction of an auction at one or more central locations in southwest Nova Scotia would not only alter the manner in which fish is bought and sold, but if successful, it could in the long run lead to changes in the economic geography of the area. The extent of these changes would depend on the success of the auction system and how widespread its use became. The source of the changes would be the disruption to the present flow of landings to processing plants. The number of inshore vessels and the size of the resource are more or less fixed, at least in the short run. This means the fish offered for sale through the auction would not be available to the processors who formerly bought it unless, of course, they too participated in the auction. Some processors are not likely to survive. In the long run, transportation and processing economics would tend to induce others to locate or re-locate in the auction port thereby promoting the growth of that community. This growth is likely to be at the expense of several of the smaller communities in the area.

Who Would Manage?

An auction requires infrastructure including a wharf and unloading facilities, an enclosed display area (preferably refrigerated), services including ice, water, transportation and communications, and offices. Such facilities would be expensive to construct, and all things considered, the venture would represent a considerable risk for a private investor. As in other areas, responsibility for establishing (and possibly operating) the facilities would probably fall to either municipal and/or provincial government.

3. Summary and Conclusions

In only a few study ports is there a statistically significant relationship between landed prices and fresh fish prices in the New England market. These ports are confined primarily to the Scotia-Fundy Region, and more specifically to southwest Nova Scotia. While the relationships are significant, in only one or two cases are there what might be regarded as relatively strong correlations. In general, the price relationships are stronger for haddock, a species with a relatively limited range of product forms, than cod. The results suggest that at best port market prices are responsive to long-term trends in the New England market, but are not responsive to short-term fluctuations.

Two factors account for the lack of responsiveness. First, market structure tends to inhibit price competition at the port level. Second, in situations where decisions to adjust the price paid to fishermen depend on changes in prices in the new England market, buyers are likely to wait until that price change has been sustained long enough to confirm whether it is a real rather than a temporary movement. This concern stems from the uncertainty over the meaning of prices established on the Boston auction. These prices are influenced by many factors, not simply supply and demand. These other factors undermine the value of the auction as an indicator of the overall state of the market.

Even if port prices were more responsive to day-to-day changes in product markets, the evidence suggests fishermen would not react to these changes by adjusting fishing behaviour. The global quota system encourages the fisherman to catch as much as possible as fast as possible, thus effectively preventing the fisherman from timing effort in response to price signals.

The introduction of fish auctions patterned on the European model would probably improve the effectiveness of the port market mechanism. One of the main advantages of the auction system is that it is straighforward: buyers compete openly and prices are established in accordance with supply and demand. Another advantage is its ability to dispose rapidly of fresh fish; market determined prices automatically adapt to variable landings. Where there is wide variation in species, sizes and qualities, fixed price arrangements are too complicated to meet often diversified marketing arrangements. In the auction system, the way in which choice is made by the buyer closely approximates the quality grading and sorting that occurs under an elaborate classification system. The auction system ensures the best quality receives the best price.

Any attempt to introduce auctions in Atlantic Canada would meet with considerable difficulty, not simply because communities are conservative and would resist change, but also because in most areas the circumstances are not conducive to this method of transacting the sale of fish and because there is no guarantee fishermen and processors would find themselves better off. Two of the critical conditions necessary to support an auction are a significant quantity of landings, with some regularity throughout the year, and a strong demand for fresh fish. These conditions are found in only a few ports in southwest Nova Scotia, and even then, the market for fresh fish is in the U.S., not Canada.

BIBLIOGRAPHY

Apostle, Richard; Barrett, Gene, *Nova Scotia Fish Processing and the New England Market*, presented at the Conference on Resource Economics in Emerging Free Trade, University of Maine, Orono, January, 1986.

Blair, Robert, *An Appraisal of the Potential Contribution of a Fish Auction System to the Improvement of Primary Marketing of Fish and to the Earnings of Fishermen in the Province of Newfoundland, Canada*, St. John's, July, 1977.

Bockstael, Nancy, *A Market Model for New England Groundfish Industry* , University of Rhode Island, Agricultural Experiment Station Bulletin Number 422, July, 1977.

CEIC, *Income Protection/Stabilization and the Fishing Industry*, 1982.

Canadian Gazette, *Atlantic Fishery Registration and Licensing Regulations*, various volumes.

Commission on Pacific Fisheries Policy, *Turning the Tide: A New Policy for Canada's Pacific Fisheries*, Vancouver, September, 1982.

Copithorne, Lawrence, *Newfoundland Revisited*, Discussion Paper No. 296, prepared for the Economic Council of Canada, Ottawa, January, 1986.

Doucet, F.J. Consultant Ltd., *The Marketing of Canadian Lobsters*, prepared for the Department of Fisheries and Oceans, Toledo, Ontario, February, 1983.

Department of the Environment, *Policy for Canada's Commercial Fisheries* , Ottawa, May, 1976.

Department of Fisheries and Oceans, *Annual Statistical Review*, 1983.

Department of Fisheries and Oceans, *Atlantic Shore Processing Capacity Study*, Ottawa, 1983.

Department of Fisheries and Oceans, *Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises in the Newfoundland Region*, 1984.

Department of Fisheries and Oceans, *Costs and Earnings of Selected Inshore and Nearshore Fishing Enterprises, Gulf Region*, 1983.

Department of Fisheries and Oceans, *Fish Auctions and Centralized Ports in Nova Scotia*, September, 1982.

Department of Fisheries and Oceans, *Scotia-Fundy Region: Inshore Scallop Fishery Licensing Policy*, Ottawa, 1985.

Department of Fisheries and Oceans, *Underwater World*, various issues.

Georgianna, Daniel; Dirlam, Joel, *The Canadian Export - U.S. Import Groundfish and Scallop Trade*, December, 1983.

Harris, S., *Price Structure for Fish Products from Atlantic Canada*, Department of Fisheries and Oceans, Ottawa, October, 1985.

Levelton, C.R., *Toward an Atlantic Coast Commercial Fisheries Licensing System*, 1981.

Mazany, R.L., *Patterns of Fish Products Trade Between Atlantic Canada and New England*, research paper funded by a research grant from the Donner Canadian Foundation and also from the Department of Fisheries and Oceans subvention program.

Mazany, R.L., *Trade Flows and Market Structure: Atlantic Canada and New England Trade in Fish Products*, Paper presented at the conference "Resource Economics in Emerging Free Trade", University of Maine, Orono, Maine, January, 1986.

Mazany, R.L.; Barrett, L.G.; Apostle, R.A., *Market Segmentation: Nova Scotia Fish Processing and the United States Market*, Gorsebrook Research Institute for Atlantic Canada Studies, Saint Mary's University, Halifax, April, 1986.

Mazany, R.L.; Neill, R.F., *Port Markets and Commodity Flows: The Boston Fish Market*, presented at the Canadian Economic Association Meetings, Montreal, May, 1985.

OECD, *Price Systems in the Fishing Industry*, Adopted by the Committee for Fisheries and approved by the Council at its meeting on May 10, 1966.

Peacock, F. Gregory; MacFarlane, Dougald A., *A Review of Quasi-Property Rights in the Herring Purse Seine Fishery of the Scotia-Fundy Region of Canada* , presented to A Workshop on North Pacific Longline Fishery Management Options, San Juan Islands, Washington, April, 1986.

Peart, T.F., *An Economic Survey of the Canadian Atlantic Groundfish Processing Industry*, Department of Fisheries and Oceans, 1977.

Shaffer, Marvin, *An Economic Study of the Structure of the British Columbia Salmon Industry*, prepared for the Department of Fisheries and Oceans and the Ministry of Environment, British Columbia, April, 1979.

Marvin Shaffer & Associates Ltd., *Structure, Behaviour and Performance of the Atlantic Groundfish Industry with Special Reference to the Quality Enhancement Program*, Prepared for the Department of Fisheries and Oceans, Ottawa, March, 1981.

Steinburg, Charles, *Structure and Price Determination in Maritime Port Markets: A Study of Fishermen/Buyer Relations*, prepared for the Department of Fisheries and Oceans, Ottawa, November, 1984.

Task Force on Atlantic Fisheries, *Navigating Troubled Waters: A New Policy for the Atlantic Fisheries*, Ottawa, December, 1982.

Tavel Limited; Peat, Marwick and Partners, *The Impact of Implementing Dockside Grading in Southwest Nova Scotia*, report to the Industry-Government Steering Committee, Halifax, March, 1985.

United States International Trade Commission, *Conditions of Competition Affecting the Northeastern U.S. Groundfish and Scallop Industries in Selected Markets*, 1984.

United States Department of Commerce, *Fisheries of the United States*, Washington, D.C., April, 1985.

United States Department of Commerce, *National Marine Fisheries Service*, Fisheries of the United States.

Wang Stanley, D.H., *Partial Adjustment Price Models: A Study of the Impact of Fish Imports on Ex-Vessel Prices on New England Groundfish*, National Marine Fisheries Service, Gloucester, Massachusetts.

Wilson, James, *The Blue Sheets and the New England Fisheries Market*, 1985.

Wilson, James A., *Free Trade in the Fisheries of Atlantic Canada and New England: The Conditions for Mutual Gain*, prepared for "Resource Economies in Emerging Free Trade: A Masine/Canadian Trade Conference", Orono, Maine, January, 1986.